

KEDAH AND PERLIS ANNUAL REPORT

OF THE
MEDICAL DEPARTMENT

FOR

1938

BY

J. C. CARSON, M.B., B.CH., B.A.O., & D.T.M.,

STATE SURGEON, KEDAH.

Alor Star:

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INTRODUCTION.

The following report is composed of two sections, one dealing with the work of the Kedah Medical Department, the second part being an account of the work performed by the corresponding department of the State of Perlis.

Kedah (area = 3,648 square miles; population = 474,800) and Perlis (area = 310 square miles; population = 52,700) are two Unfederated Malay States, entirely separate from each other politically, but bearing a close relation in other important respects, *e.g.* geographically, in composition of population and in similarity of main health problems. The analogy between the two States in these respects offers sufficient justification for a combined medical report; but a further reason is afforded by the fact that the Head of the Kedah Medical Department (State Surgeon) functions as the Official Supervisor of the Perlis Medical Department, the link drawing together the Medical Departments of the two States being thus strengthened. From the medical point of view Kedah and Perlis are very similar to each other; the difference between them is merely one of relative size and degree of development.

It is gratifying to note that the various elements of the Kedah "Scheme" adumbrated in the introduction to last year's report have been successfully put into effect. Obviously it is far too early to begin to search for benefits resulting from the introduction of the various measures outlined therein, especially in the case of the kampong midwife service. The seven women who finished their training during the past years, and who were actually posted to their kampongs, have an uphill fight not only in gaining the confidence of the people by overcoming the highly developed natural conservatism of the Malays, who look on any alteration of the old regime with grave suspicion, but also in combating the subterfuges of the old bidans, whose militant opposition to the coming of the Government midwife is a factor to be reckoned with. The bidans' objection is easily understood; the qualified midwife has come to oust her and deprive her of her "legitimate" trade. Preparation of the ground by propaganda, and the exceedingly helpful co-operation of District Officers and Penghulus have resulted in immediate success even beyond the most sanguine expectations. Six more midwives will be posted to kampongs during next year, and six new pupils will commence their training.

The reorganization of the Health Division has necessitated an increase in staff, the most important of which being an additional post of Assistant Health Officer, primarily intended for general health work in North Kedah, but concentrating his activities on laying the foundations of a regular School Medical Inspection Service, and starting a Venereal Diseases Clinic. The Government's approval for the increase in staff has been granted.

The Dental Department is rapidly developing. Next year a dental mechanic will be available:

	New cases.	Repetitions.
January	101	112
February	63	66
March	82	83
April	71	51
May	122	102
June	134	116
July	168	102
August	105	36
September	92	71
October	91	73
November	50	66
December	96	110

Success in the first steps of development of the Department has been a strong incentive towards elaborating further developments, the most important of which are the institution of a Tuberculosis Department at the General Hospital and the establishment of a Venereal Disease Clinic as a special branch of the Town Dispensary at Alor Star. The putting into effect during the next financial year of both of these departmental expansions, a short outline of which follows, has received the Government's approval.

An excellent opportunity is afforded by the very considerable experience in radiology and in diseases of the chest which one of the Assistant Medical Officers (Dr. Nayar) acquired in England. Modern methods of treatment of tuberculosis constituted the subject which he recently pursued during an intensive course of study at the Brompton Hospital. The main outline of the scheme is to have a special ward constructed, to obtain equipment and instruments for such measures as Artificial Pneumothorax, and to establish an out-patient clinic. This service has in effect already been successfully started on a small scale, and there is every reason to expect continuation of this initial success when the scheme is fully developed.

The establishment of a Venereal Disease Clinic, with its special sessions separate in time and place from the general clinic, is considered to be a very desirable and useful adjunct. A spare room in the new Town Dispensary, very suitably situated for privacy, will be furnished and equipped for out-door treatment of male patients. If the initial stages of the scheme at Alor Star warrant it, extension of the service to Sungei Patani and Kulim may be contemplated later on.

Further considerable extension of the chain of kampong dispensaries is assured; very shortly the whole of the rice growing population of North Kedah will be very efficiently served by a complete system of such dispensaries; the remoter centres of Central and South Kedah are also receiving attention.

By adopting the Straits Settlements and Federated Malay States syllabus of training and rules of examination of dressers, the status of Kedah-trained dressers has been brought into line with that of the other important administrations, and the certificate of efficiency issued by Kedah is now entitled to the same recognition as that accorded to certificates issued by the other Malayan administrations. This may not be of vital importance to Government dressers, but it is to those employed by estates. In any case a considerable rise in the standard of training, making for increased efficiency, is the immediate result.

Kedah is maintaining three medical and one dental students at the Singapore College of Medicine, one of the former being a Kedah born and educated girl, who, it is hoped, will join the Kedah Medical Service as Lady Assistant Medical Officer on qualifying L.M.S. (Singapore). One Health Inspector will be sent to Singapore to attend the course for the Diploma of the Royal Sanitary Institute.

With regard to Perlis two landmarks in advancement may be mentioned, namely: (a) the introduction of the kampong Midwifery Service as in Kedah (two midwives were trained at Alor Star and duly posted to her kampong in Perlis, (b) the creation of the nucleus of a Public Health Service: a whole time Assistant Health Officer is employed; he underwent a course of intensive training under the Senior Health Officer, Kedah, with a view to rendering himself familiar with local problems, especially in respect of Malaria and its control, Sanitary Board Work, Estate inspection, school inspection, rural hygiene and registration of births and deaths.

The year under review shewed an increase in the total death rate which was undoubtedly due to the increase in deaths from malaria and unspecified fever. Apart from the wave of malaria the year in general was a healthy one. The infantile mortality rate shewed a further decline from 138 in 1937 to 131. The general death rate, however, rose from 20.6 to 22. No major communicable disease was reported throughout the year, and the absence of cholera in the neighbouring State of Siam was a great relief. A definite increase of malaria was recorded throughout the State, but the towns and villages protected by the Health Department shewed no increase.

The water supplies of the State continued to receive attention. Many areas are still without adequate supplies, but, owing to the distance in many places of suitable sources, some time must elapse before proper supplies will be possible.

Urban areas continued to receive attention during the year. With the removal of the Senior Health Officer to Alor Star and the appointment of an Assistant Health Officer to Kulim, it has been possible to devote more attention to Sanitary Board work in these areas.

Proposal for sewage schemes for Alor Star are still under consideration. The possibility of a water carriage scheme in Alor Star similar to the scheme in Penang is being considered.

The general health in Perlis may likewise be reported as good. The death rate rose from 18.31 in 1937 to 20.04 and the infantile mortality rate also from 105.41 to 111.00. Cerebrospinal Meningitis was limited to two cases only. Malaria and unspecified fevers shewed some increase and was responsible for the increased death rate.

Kampong midwives are proving a great success. It is hoped that this branch of the service will be rapidly increased. Trained nurses will be introduced as health visitors to supervise this work.

REPORT OF THE MEDICAL DEPARTMENT, KEDAH.

FOR THE YEAR 1938.



For the purpose of departmental administration the State is divided into four districts viz. North, Central, South and the Island of Langkawi with the adjoining islands.

North Kedah has an area of 1,549 square miles with an approximate population of 244,000;

Central Kedah has an area of 1,546 square miles with an approximate population of 130,500;

South Kedah has an area of 553 square miles with an approximate population of 87,500;

Langkawi and the adjoining islands have an area of 59 square miles with an approximate population of 12,500.

I. ADMINISTRATION.

(a) STAFF.

(i) The Principal appointments are:—

The State Surgeon (Head of the Medical Department).

The Senior Health Officer (and State Registrar of Births and Deaths).

1 Health Officer.

2 Assistant Health Officers.

2 Medical Officers.

7 Assistant Medical Officers.

1 Lady Medical Officer.

1 Pathologist.

1 Assistant Pathologist.

1 Assistant Dental Officer.

3 Nursing Sisters.

5 Nurses.

56 Dressers.

4 Laboratory Assistants.

1 Dispenser-Storekeeper.

8 Midwives.

6 Vaccinators.

9 Health Inspectors attached to the Health Office.

11 Health Inspectors attached to the various Sanitary Boards.

(ii) Most of the above appointments were held as stated hereunder:

Dr. J. C. Carson (State Surgeon), Dr. D. A. Beattie (Medical Officer, North Kedah), Dr. M. P. O'Connor (Medical Officer, South Kedah), Dr. E. D. B. Wolfe (Health Officer, Central Kedah) and Dr. M. B. Osman (Pathologist), carried out the duties of their respective posts throughout the year, as did the following Assistant Medical Officers: Dr. P. T. K. Nayar, Dr. S. M. Kumarasamy, Dr. Tan Joo Cheng, Dr. S. K. Kelkar, Dr. Low Thean Loy, Dr. C. Sinnadurai, and Dr. S. Row.

Dr. R. D. Gross acted as Senior Health Officer.

Dr. Mabel G. Brodie returned from leave on November 12th thus relieving Dr. Margaret E. Hopkins who had been acting for her as Lady Medical Officer, Alor Star.

Dr. M. R. Bhandari proceeded on leave on 15th February to take up D. O. M. S. Course in England.

Dr. B. R. O. Willis, L.D.S., Singapore is the Assistant Dental Officer.

Nursing Sister D. E. Allen was transferred from Kedah on 20th December; she was relieved by Nursing Sister M. D. Duff.

(b) FINANCIAL.

No detailed analysis of figures is called for in a report of this nature, but the following statements may not be irrelevant.

The revenue collected by the Department, consisting mainly of hospital fees, sale of medicines, drugs licences, fees for registration of dentists, certificates of birth or death and fees for laboratory work, amounted to \$21,729 as compared with \$16,384 collected during 1937.

The total expenditure amounted to \$556,102, this figure being made up of \$294,311 for Personal Emoluments and \$261,791 for Other Charges.

The expenditure figures do not include erection or upkeep of buildings and supply of furniture to staff, such expenditure being shown under Public Works headings.

(c) MEDICAL INSTITUTIONS.

NORTH KEDAH.

General Hospital, Alor Star	..	..	..	..	325 beds.
Out-door Dispensary and Clinic, Alor Star Town.					
„ „ Jitra.					
„ „ Changloon.					
„ „ Kuala Nerang.					
„ „ Yen.					

CENTRAL KEDAH.

District Hospital, Sungei Patani	..	..	..	..	300 beds.
„ „ Baling	..	..	..	..	28 „
Out-door Dispensary, Sik.					

SOUTH KEDAH.

District Hospital, Kulim	..	..	..	..	231 beds.
Out-door Dispensary, Bandar Bahru.					

LANGKAWI.

District Hospital, Kuah	..	..	..	..	83 beds.
Out-door Dispensary, Padang Masirat.					

Each of the hospitals mentioned has a regular out-door clinic in addition.

North, Central and South Districts are provided with an extensive motor travelling dispensary service by which regular visits are made to villages, schools and Police Stations wherever they are accessible by road.

In Langkawi Island an Assistant Medical Officer or a Dresser visits all villages regularly by sea or by road distributing medicines, vaccinating, giving injections and inspecting schools.

The above hospitals, providing a normal total bed accommodation of 967, cater solely for the needs of the general public and, of course, Government Officials; the medical requirements of the large labour forces on rubber estates are met by the Health Board organization which controls the various groups, each running its own medical affairs more or less independently, but having to comply with the requirements of the Labour Code, the fulfilment of the provisions of which is supervised and, if necessary, enforced by the Government Health Department. The Health Board groups maintain the following hospitals:

1. Serdang Group	..	..	..	..	..	120 beds.
2. Dublin Estate ..	..	..	..	..	..	74 „
3. Bukit Mertajam Estate ..	..	..	..	..	..	50 „
4. Padang Serai Group	..	..	..	..	..	110 „
5. Kuala Ketil Group	..	..	..	..	..	95 „
6. Sungei Ular Estate	..	..	..	..	..	50 „
7. Badenoch Estate	..	..	..	..	..	60 „
8. Harvard Estate	..	..	..	..	..	74 „
9. Sungei Patani Group	..	..	..	..	..	180 „
10. Bedong Group ..	..	..	..	..	..	200 „
11. Sungei Tawar Estate	..	..	..	..	..	52 „
12. Scarborough Estate	..	..	..	..	..	36 „
TOTAL ..						1,101 beds.

The total organised hospital accommodation of the State may, therefore, be quoted as:

State Government Hospitals ..	..	..	..	..	..	967 beds.
Health Board Hospitals	..	..	..	..	..	1,101 „
TOTAL ..						2,068 beds.

Each out-door dispensary has a few emergency beds in a small room set apart for the purpose, but these are seldom, if ever, used.

Although a certain amount of preventive work is carried out by all the above institutions as and when the occasion arises, they are essentially “curative” units; the following are solely “preventive” units maintained by Government:

1. Central Health Office and Registry at Alor Star, comprising the offices of the Senior Health Officer, an Assistant Health Officer, Health Inspectors, Clerical Staff, Central Registry of Births and Deaths, a mosquito research laboratory and a Health Propaganda Museum;
2. the Office of the Health Officer, Central Kedah, at Sungei Patani;
3. the Office of the Assistant Health Officer, South Kedah, at Kulim.

Mention may also be made of the Central Pathological Laboratory at which all serological, bacteriological, and histological examinations are carried out. It is situated at Sungei Patani for convenience, this town being the most central. This laboratory carries out tests not only for Government institutions, but also as requested by the Estate Group Hospitals.

(d) BUILDINGS.

The matter dealt with under this heading is intended to convey information concerning new buildings. The list of new buildings would have been considerably longer had the programme approved for the year been carried out, but several unforeseen causes of delay arose which interfered with the actual completion of all the buildings. As practically everything was well advanced in course of construction at the end of the year, new buildings for 1938 may be stated to have been as follow :

1. Laundry Shed, General Hospital, Alor Star.
2. Attendants' quarters, General Hospital, Alor Star.
3. New Dispensary and quarters for Staff at Bandar Bahru.
4. Assistant Medical Officer's Quarters, Langkawi.
5. Dispensary with Dresser's and Attendant's Quarters, Ayer Hitam.
6. Twelve Attendants' Quarters, General Hospital, Alor Star.
7. Latrine and Bathroom, 2nd Class Ward, General Hospital, Alor Star.
8. New Quarters to replace Quarters No. 153 Jalan Hospital, Alor Star.
9. Alterations to Casualty and Admission Room, General Hospital, Alor Star.

The usual upkeep of all buildings has been satisfactorily attended to by the Public Works Department.

PART II.

WOMEN DEPARTMENT

BY

DR. M. G. BRODIE, M.B., B.CH., D.P.H., D.T.M. & H.,
LADY MEDICAL OFFICER, KEDAH.

The totals show that the number of patients examined during 1938 have far exceeded those in any previous year—*e.g.* the average number of outpatients, women and children, per month, seen at the hospital has been 301.7. Actually 11 months should be reckoned because, for two periods totalling over 23 days, no record was kept (the L.M.O. was on leave). This makes 328 per month.

At the Town Dispensary over 3,000 more patients than in any previous year have been treated, the average being 550 per month. In November (Bulan Puasa), the Dispensary was open on only 3 afternoons, so that the actual average is higher—roughly 600 per month.

Among those attending the hospital outpatient department, Malays exceeded the number of Chinese and comprised practically 50% of the total. At the Town Dispensary they account for over 40% of the new cases; out of a total of 6,600 attendances, Malays account for 2,319—nearly 30%.

As a comparison, appended are the numbers of women and children seen as outpatients by the Lady Medical Officer at the Town Dispensary and at the Hospital during the last 5 years. (These do not include indoor patients).

TOWN DISPENSARY.

					Total.	New.	Revisits.
1934	..	..	..	..	3,819	1,911	1,908
1935	..	..	..	..	4,132	2,022	2,110
1936	..	..	..	..	5,514	2,378	3,136
1937	..	..	..	..	3,716	2,602	1,614
1938	..	..	..	..	6,600	2,925	3,685

HOSPITAL OUTPATIENTS.

					Total.	New.	Revisits.
1934	..	..	..	..	1,400	804	596
1935	..	..	..	..	1,371	731	640
1936	..	..	..	..	1,051	506	545
1937	..	..	..	..	1,652	891	761
1938	..	..	..	..	3,615	1,452	2,163

It is also satisfactory to be able to report that during 1938, a total of 321 expectant mothers have been seen as outpatients, 203 at the Town Dispensary and 118 at the Hospital. Actually a considerable number of others have been seen in their own homes. One or two old bidans have brought all their “booked” cases for examination and seem glad to be able to do so. A separate Ante-Natal Clinic is most desirable, but not practical at the moment—shortage of staff precludes further developments. Practically all outside visits were paid to the houses of Malays and Europeans—the greater majority to Malays; a number of these being expectant mothers and lying-in cases.

Hospital Outpatients.

The outpatient department has been conducted under difficulties. During the whole of the year the noise caused by the building of the X-Ray and Dental rooms and the new Maternity Ward has made the work very trying.

One hesitates to complain, but on Mondays and Saturdays it has been particularly exhausting. On Mondays, European and Malay babies are weighed, and usually 30 to 40 mothers attend. On Saturdays, cases of Yaws come in, often from long distances and the noise has made it most difficult to examine patients thoroughly.

It is very satisfactory to be able to state that an appreciable percentage of all babies have attended regularly throughout the year—either fortnightly or weekly. The majority of the European babies have been weighed weekly and have made most satisfactory progress. Many Malay babies too, have attended for weighing, but parents and staff have missed the Malay Clinic (now the Health Office) where there was a certain amount of privacy and peace and more teaching was possible.

This outpatient clinic on Monday mornings is really an effort to keep in view the idea of a welfare centre, long promised and so much needed in Kedah. So far as breast feeding is concerned, Europeans do not show a very good example to their Asiatic sisters, but the latter are more prone to wean their babies, and that on to Sweetened Condensed Milk. An attempt has therefore been made to emphasize the importance of breast feeding, and, failing this, to advocate one of the dried milks with added vitamins; but expense is an objection to the general acceptance of this substitute. Babies fed on sweetened condensed milk only, without added vitamins, are invariably fat and flabby, and suffer from one of the common catarrhal disorders—diarrhoea, bronchitis, nasal catarrh, etc. When these occur, they are brought for medicine. One feels, that with proper feeding, actual drugs for young babies ought to be unnecessary, but mothers still pin their faith on physic. (One finds too that cinema advertisements do achieve their object). Even with added Cod Liver Oil babies do not do so well on sweetened condensed milk as those fed on Dried Milk with similar additions. A number show a deficiency of vitamin B, and every effort is made to dissuade mothers from using polished rice. Women are under the impression that breast feeding is old fashioned and bottle feeding more sophisticated. All “Dummies” are seized and destroyed on the spot. A considerable number of women still use flour and “Sujee” to augment the feeds in the hope of producing large fat babies.

Expectant mothers are advised beforehand that breast feeding is best; preparatory treatment is recommended for their breasts and nipples, and a suitable diet outlined for them.

A very large percentage of women attending O.Ps are gynaecological cases—and regular treatment by the Lady Medical Officer is carried out so long as they attend. A few are persuaded to become inpatients—since in certain cases “rest in bed” is essential to complete cure.

One of the tragedies of Malaya is the number of young girls who become infected by their husbands with gonorrhoea immediately after marriage. Parents should be warned not to let their young daughters marry infected men; it only makes for illness and unhappiness. Girls, infected immediately after marriage, often have unfortunate sequelae, one being, that, because they have no children, they may be divorced—the husbands rarely thinking themselves at fault. Many men marry knowing they have had one form of venereal disease, but decide to risk it.

A very large number of outpatients suffer from Anaemia and its complications *e.g.* irregular and defective menstruation—general weakness, abortion etc. In trying to investigate the cause, it is usual to find that in addition to infections with intestinal parasites or protozoa (*e.g.* Malaria) many of these have monotonous and unbalanced diets. Advice is always given about food, iron and cod liver oil supplied, and regular attendance urged in addition to definite periods in the sun. In some cases, the patients have become normal—but there are always those who imagine that one bottle of medicine ought to cure and consequently remain uncured.

Far too many women remain indoors all day long and seldom experience the stimulating effect of direct sunlight and fresh air. An attempt was made to examine the blood of all expectant mothers. Those with definite signs of syphilis were treated together with their husbands. The majority came for injections, but a percentage failed to believe that such were required. 45 positive cases were given treatment at outpatients and many more in the wards.

Clinics for gynaecological cases only (not V.D. Clinics *per se*) would do a great deal of good—but a specially trained nurse would be required to do regular daily treatment. A number of infected women would be willing to attend.

To the Outpatient Department also, come many cases of Uterine displacement. Most of these women have at some period employed “Kampong Bidans” with their treatment of fire baths and massage with heavy irons; these usually come for advice about dysmenorrhoea, due to infections and unrepaired tears of the cervix and Vagina as well as uterine displacements and their resultant complications and symptoms.

The bulk of the children suffer from intestinal parasites and errors of feeding and at least 80% of all outpatients suffer from worms. One must repeat, that personal instruction in cleanliness to parents in their homes, taught by a competent health visitor, should go far towards reducing these infections. Although as much as possible is done, there is so little time to teach in the outpatient department. It is utterly impossible to cope adequately with all the cases attending the clinics, who require such instruction, but it is obvious that, in time, prevention would save the State many hundred of dollars per year.

The majority of the diseases for which one has to advise treatment are preventable, and a campaign of education in personal hygiene is urgently required in Kedah. One feels sure that one result of such instruction, would be the reduction of artificial feeding and in the incidence of convulsions and enteritis, with a corresponding drop in the death-rate of children under 4 weeks old. A very large number of children (far too many) die within the first month of life.

Kampong women need education as to the importance of using only skilled midwives. They do not realise the danger of employing an ignorant woman, who has no knowledge of asepsis—whose mouth in many cases, is thoroughly septic and a considerable source of danger to the lying-in woman.

The *Female General Wards* have during the year been frequently so overcrowded that there was no room for additional patients. A second General ward is definitely required, also wards for children, for Phthisis and for septic cases.

More Malay women and children have been admitted during 1938 than in any previous year; many of them from distant Kampongs. A few Malay women have even come in for their confinements; but special wards for Malays are also urgently required. They do not like the publicity of the General Wards.

The Maternity Wards have been well used during the year; a considerable number of waiting cases have been treated. These really ought to be encouraged and a separate ward provided for them—since it is unwise to have to mix “lying-in” women with any other type of case.

Expectant mothers, who come in for a period beforehand, can be overhauled and given a certain amount of treatment before the child is due. The majority have intestinal parasites and some degree of anaemia. Many have dental caries—but they have not yet been educated to part with their bad teeth while pregnant. All lying-in mothers, while in the ward, are urged to continue breast feeding at home. They are given a card on which is the baby's weight and advised to return to the hospital or attend the Town Dispensary for further weighing and to take the card with them. A fair percentage do return, but it is not unusual, to find that the babies have gained 4 to 5 pounds in the first month due to irregular and overfeeding. An attack of Colic or Diarrhoea then sends the mother to seek advice—and after a further homily on feeding, she seems to realise the mistake of giving the breast or the bottle to the child every time it cries—(almost an international habit), and that there is a limit to the capacity of a baby's stomach.

The *Yaws Clinic* continues to be popular—patients come from long distances and although one urges regular attendance for a full course of injection—many people find it impossible to spare the necessary fare for transport. One hopes that in time treatment centres will be within easy reach of every kampong, so that no long journeys need be undertaken. Penghulus ought to be urged to send people for treatment when the first sign of yaws develops (there is an idea generally prevalent that infected cases must wait 6 months)—then fewer injections would be required; less crippling and fewer deformities would occur—and the State would be saved much expense. Prevention, having no spectacular results, requires many years of intensive propaganda to appeal to the general public.

Many patients coming to the Yaws Clinic suffer from other complaints which are treated so far as the number of visits allow. On the other hand, the Statistics show that the number of re-injections is on the increase and a fair percentage have had full courses of treatment.

Another point requiring tactful mention is the question of repeated intermarriage of relations. This ought to be discouraged, since the continuous mixing of blood relations tends to racial degeneration.

The age at which young girls are married should also be raised to 17 or 18. Many are now unfit to be wives both physically and mentally. On the physical side the children suffer—they are often born puny and with deficient vitality and the mother's body has hardly time to recover before a second child is expected.

One feels homes would be better managed if more domestic science and hygiene were taught in the girls' Schools—while a general education is a great asset, it is equally important to have a knowledge of parentcraft and housecraft, especially where the latter relates to the preparation and selecting of meals. More milk, eggs, fruit and vegetables ought to be included in the diets. Fresh milk, one of the most important foods, is actually unfit for consumption in Kedah, because neither the milkers, nor the vendors, nor the owners of the cows have any idea what “clean” milk really implies. There is a vast amount of work required in this direction.

Actually the old Maternity ward is being replaced by a new ward, and, although an improvement on the old one, is not yet equipped in the most modern style.

A small ward with separate cubicles is desirable for cases of infectious disease which have to be treated in the General wards when Malay Huts are occupied. Even if they can be isolated in the Malay Huts, this limits separate accommodation for Malays.

One has however, good reason to be optimistic. During the last few years many advances can be noted.

Women are far more ready than ever before, not only to seek advice, but to ask for examinations. Houses are cleaner and many babies are healthier.

One would like to see a few Health Pictures shown periodically at the Local Cinemas—this would stimulate the interest of the people, and would help to emphasize the great importance of a healthy body.

It behoves the State to take into consideration the amount of sickness among Government employees alone. The result of reducing this would certainly mean more continuous efficiency and a greater output of work in all departments.

The attached figures show that the work of the last few years has brought forth a satisfactory response from the women themselves. This deserves equally encouraging support from the State. Since the general health of the population is mainly dependent on the health of the women and children, the latter being the future men and women—and therefore parents, it is important that all sections of the community should remain free from damaging disease.

One cannot help feeling that Travelling Dispensaries, although good in themselves—do not meet the need of the women and children. Health Centres with a trained Medical Woman in charge are most urgently required in many of the out-lying areas. Weekly sessions would deal with a fair number in the beginning—but these would have to be increased, when the numbers become unmanageable.

Consideration of the foregoing facts prove that the plea for an additional Lady Medical Officer is justified. As things exist, and if the numbers increase further during 1939, it would be almost impossible to expand or develop the work further.

MABEL G. BRODIE, M.B., B.CH., D.P.H., D.T.M. & H.

Lady Medical Officer.

HOSPITAL OUT PATIENT DEPARTMENT—WOMEN AND CHILDREN, 1938.

Month	Total	New	Revisits	Women	Children	Malay	Chinese	Tamil	Sikh	European and others	Average per day	Expectant mothers
January ...	288	183	105	98	85	75	50	20	18	20	12	12
February	200	104	96	41	63	59	28	14	1	2	12	3
March ...	352	140	212	90	50	67	45	16	6	6	16	10
April ...	295	141	154	81	60	61	51	13	12	4	13.5	16
May ...	362	148	214	93	55	74	45	19	3	7	13.5	17
June ...	297	117	180	71	46	37	61	15	4	...	12.7	4
July ...	319	120	199	76	44	53	47	13	2	5	15	10
August ...	341	113	228	58	55	61	43	4	1	4	13.4	12
September	321	110	211	50	60	57	45	6	2	...	17.1	9
October ...	327	104	223	51	53	45	42	14	1	2	16.5	8
Nov. (Puasa)	251	71	180	37	34	28	35	7	1	...	16.6	4
December (till 21st)	262	101	161	54	47	61	31	9	...	...	16.4	13
Total ...	3,615	1,452	2,163	800	652	678	523	150	51	50	14.55	118

REVISITS.

Month	Malays	Chinese	Tamil	Sikh	European and others
January ...	34	20	14	11	26
February ...	35	26	7	3	25
March ...	83	47	22	6	54
April ...	52	43	19	12	28
May ...	86	62	15	17	34
June ...	66	69	15	3	27
July ...	66	67	21	14	31
August ...	99	65	7	17	40
September ...	69	93	5	3	41
October ...	73	79	20	9	42
November ...	57	67	22	9	25
December ...	79	40	13	9	20
Total ...	799	678	180	113	393

LADY MEDICAL OFFICER OUT PATIENTS.

TOWN DISPENSARY, 1938.

Month	Total	New	Revisits	Women	Children	Malay	Chinese	Tamil	Sikh	Others	Average session	Expectant mothers
January ...	439	314	125	131	183	113	133	34	33	1	25.8	17
February	373	182	191	80	102	54	79	32	16	1	28.6	7
March ...	610	264	346	105	159	90	138	24	10	2	38	8
April ...	652	334	318	140	194	127	148	42	15	2	40.7	14
May ...	701	312	389	134	178	100	164	39	6	3	39	17
June ...	704	294	410	134	160	110	136	38	6	4	41.4	32
July ...	676	271	405	116	155	95	120	48	7	1	42.2	28
August ...	760	285	475	129	156	104	133	42	6	...	40	21
September	587	224	363	81	143	86	110	24	2	2	39	16
October ...	460	178	292	82	96	67	88	18	4	1	33	17
Nov. (Puasa)	85	46	39	24	22	21	17	6	2	...	47	8
December	553	221	332	98	123	80	102	27	11	1	32.5	18
Total ...	6,600	2,925	3,685	1,254	1,671	1,047	1,368	374	118	18	37.27	203

RESULTS.

Months			Total	Malay	Chinese	Tamil	Sikh	Others
January	...	...	125	36	54	15	20	...
February	...	...	191	49	67	24	50	1
March	...	...	346	105	144	45	50	2
April	...	...	318	121	125	39	28	5
May	...	...	389	132	167	58	30	2
June	...	...	410	167	140	69	31	3
July	...	...	405	152	155	42	49	7
August	...	...	475	174	175	65	49	12
September	...	...	363	124	152	53	32	2
October	...	...	292	113	119	31	29	...
November (Puasa)	...	...	398	10	13	9	7	...
December	...	...	332	89	148	48	42	5
Total			3,685	1,272	1,459	498	417	39

OUTDOOR MIDWIFERY CASES, 1938 (ALOR STAR).

Month			Total	Normal	Abnormal	Still Births	Malay	Sikh	Chinese	Tamil	Arab
January	...	...	11	11	...	...	11	...	...	...	1
February	...	...	6	6	...	...	4	...	1	...	...
March	...	...	10	9	1	1	10	...	...	...	...
April	...	...	8	7	...	1	8	...	...	...	...
May	...	...	16	13	...	3	13	...	2	1	...
June	...	...	18	18	...	...	18	...	...	...	...
July	...	...	23	21	...	2	23	...	...	...	...
August	...	...	24	21	...	3	22	1	1	...	...
September	...	...	17	17	1	...	17	...	...	...	...
October	...	...	22	21	...	1	18	...	2	2	...
November	...	...	19	18	...	1	19	...	...	...	...
December	...	...	12	11	...	1	12	...	...	...	...
Total 1938			186	173	2	13	175	1	6	3	1

Stillbirths. The majority of "Stillbirths" were really non-viable being either the result of miscarriages or abortions—One *Maternal Death* was that of a patient who was repeatedly advised to have her confinement in Hospital. She was very much exhausted after frequent childbearing and Malaria—and was not in a fit condition to have another child—she died within a few hours of delivery at home.

TABLES OF CONTENTS.

				PAGE
I.—ADMINISTRATION	...	...	...	11
A. STAFF	...	...	...	11
B. FINANCE	...	...	...	12
C. MEETINGS	...	...	...	12
II.—LEGISLATION	...	...	...	12
III.—PUBLIC HEALTH	...	...	...	12
B. VITAL STATISTICS	...	...	...	13
(a) Population	...	...	...	13
(b) Migration	...	...	...	13
(c) Births and Deaths	...	...	...	13—14
Infantile Mortality	...	...	...	14
C. PREVALENCE OF, AND CONTROL OVER, COMMUNICABLE DISEASES	...	...	...	15
Enteric	...	...	...	15
Typhus	...	...	...	15
Leprosy	...	...	...	15
Phthisis	...	...	...	15
Dysentery	...	...	...	15
Vaccinations	...	...	...	16
Malaria	...	...	...	17
Measures Adopted by the Department	...	...	...	17
Control Measures	...	...	...	17
Other Measures	...	...	...	17
Larval Surveys	...	...	...	18
Adult Catches and Dissections	...	...	...	18
Malaria Incidence	...	...	...	18
Malaria on Estates	...	...	...	18
(i) European Holdings	...	...	...	18
(ii) Asiatic Holdings	...	...	...	18

				PAGE
D. SANITARY BOARD AREAS	...	...	...	19
(i) General	...	...	...	19
(ii) Sewage Disposal	...	...	...	19
(iii) Refuse Disposal	...	...	...	19
(iv) Water Supplies	...	...	...	19
(v) Drainage	...	...	...	19
(vi) Housing and Town Planning	...	...	...	20
(vii) (a) Food in Relation to Health and Diseases			...	20
(b) Slaughter Houses	...	...	...	20
(c) Restaurants and Eating Shops		...	...	20
(d) Street Stalls and Hawkers		...	...	20
(e) Bakeries	...	...	...	20
(f) Legislation	...	...	...	20
E. CONTROLLED BUILDING AREAS	...	...	...	21
F. KAMPONG AND RURAL AREAS	...	...	...	21
G. GOVERNMENT DEPARTMENTS	...	...	...	21
H. BURIAL GROUNDS	...	...	...	21
I. INDUSTRIAL HYGIENE	...	...	...	21
(a) Rubber Estates	...	...	...	21
(i) European Owned	...	...	...	21
(ii) Asiatic owned	...	...	...	21
(iii) Housing	...	...	...	21
(iv) Water Supplies	...	...	...	22
(v) Sewage Disposal	...	...	...	22
(vi) Anti-Malarial Work	...	...	...	22
(vii) Group Hospitals	...	...	...	22
(viii) Infectious Diseases	...	...	...	22
II. MILLS AND MINES	...	...	...	22
III. VITAL STATISTICS ON ESTATES	...	...	...	22
IV. MALARIA	...	...	...	23
V. SCHOOLS	...	...	...	23
A. Malay Schools Visited	...	...	...	23
B. Latrines	...	...	...	23

PART III.

HEALTH BRANCH

BY

DR. R. D. GROSS, M.D., B.S., M.R.C.S., L.R.C.P., D.P.H.,
H.T.M. & H., S.T.M.

I. ADMINISTRATION.

A. STAFF.

Senior Health Officer.

Dr. R. D. Gross carried out the duties throughout the year.

Health Officers.

Dr. E. D. B. Wolfe carried out the duties of the Health Officer, Central Kedah.

Dr. Low Chin Seang carried out the duties of Assistant Health Officer, South Kedah.

Dr. C. Sinnadurai was Assistant Health Officer, Padang Besar till 8th February, 1938.

Mr. George, Hospital Assistant took over from 9-2-38 till 18-2-38.

Dr. S. M. Kumarasamy resumed duties as Assistant Health Officer, Padang Besar from 19-2-38 till 1-5-38 when Dr. S. Row took charge.

Dr. C. Sinnadurai as Assistant Medical Officer, Langkawi was responsible also for the Health on the Island.

Office Staff. Malay.

(a) General. (Four). Two at Alor Star; one at Sungei Patani and one at Kulim.

(b) Estates. Now carried out by various corresponding clerks.

(c) Births and Deaths Registration and Statistics. Four clerks.

Inspection Staff.

Inspection staff consists of Twenty Inspectors for the whole State. One carries out the duties of Chief Anti-Malarial Inspector and eleven are attached to various Sanitary Boards. The time of the others has been fully occupied during the year with infectious disease, estate, kampong and extra Sanitary Board Inspections. There are two probationary inspectors under training. Only three of the Senior Inspectors have the certificates of the Royal Sanitary Institute.

Anti-Malaria Staff.

(a) Outdoor. One Senior Inspector, one Inspector and one Probationer Inspector and five Collectors. It is insufficient for the rapidly expanding demands of the State, in this direction.

(b) Laboratory. One trained dissector is engaged in the work of mosquito dissection and blood examination.

Vaccinating Staff.

On March 3rd, 1938, the Vaccinating Staff were handed over to this Department. It consists of 6 Vaccinators:—

2 in North Kedah.

2 in Central Kedah.

1 in South Kedah.

1 in Langkawi.

B. FINANCE.

The revenue from Births and Deaths Registration was \$662.50 for the year 1938 as compared with \$430.00 for 1937.

\$95,088.00 was approved for 1357 under the Health Vote as follows (according to the Printed Estimates).

Anti-Malarial Work	\$12,000.00
Laboratory Materials	100.00
Maintenance of Padang Besar	1,750.00
Miscellaneous	300.00
Oils and Oiling	5,000.00
Propaganda	500.00
Provision for Contagious Diseases	800.00
Telephone Trunk Call Charges	50.00
Transport	7,100.00
Uniforms	150.00
Vaccine Lymph	1,000.00
Personal Emoluments	66,338.00

During the year an additional sum of \$2,000.00 was added to the Transport Vote.

C. MEETINGS.

The following meetings were attended by the Senior Health Officer during the year:—

21 Sanitary Board Meetings.

12 Health Board and Sub-Committee Health Board Meetings.

II. LEGISLATION.

The following additional legislation was passed during the year:—

1. Amendments to Births and Deaths Enactment.

III. PUBLIC HEALTH.

The activities of the Department continued, but in addition special measures were taken to improve conditions in the Kampongs. A special report of the work done in the Kampongs is appended. (Appendix "A").

The year 1938 shewed an increase in the total death rate which was undoubtedly due to the increase in deaths from malaria and unspecified fever. Apart from the wave of malaria the year in general was a healthy one.

Of the major communicable diseases, no cholera, plague or small-pox was reported.

A considerable increase in malaria was reported throughout the State. This was in the main a seasonal increase and was added to by the replanting operations on Estates.

No actual increase in fresh cases occurred in the area controlled by the Health Department.

The Water Supplies of the State continued to receive attention. Work was commenced at Kuala Nerang for a purified supply to that town. At Kuala Sanglang special rain water tanks are under construction. Minor improvements were made to the headworks at Yen, and Bukit Pinang. Whilst the main to Alor Star was replaced by a 15" main and the reticulation in Alor Star was improved. The construction of a new service reservoir for the Bukit Wang in conjunction with purification of that supply is under consideration.

In South Kedah, purification of the supply to Kulim town was considered. Action has been postponed temporarily.

In Central Kedah, investigations still continue with regard to treatment of this supply which is at present an upland surface water.

Urban areas continued to receive attention during the year, and with the appointment of an Assistant Health Officer to South Kedah more time has been devoted to Sanitary Board work.

Proposal for Sewage Schemes for all the big towns is still under consideration. Owing to the shortage of P.W.D. staff, little advance was made, but following an inspection of the Penang Sewage Works, a scheme based on it is under consideration for Alor Star.

There was a set-back in Health conditions on Estates owing to the considerable increase in Malaria.

B. VITAL STATISTICS.

The “Balancing Equation” Method of population calculation (Census and Births—Deaths and Migration Surplus) has been used since 1935.

Year				Population	BIRTHS		DEATHS	
				Mid-Year	No.	Rate per mille	No.	Rate per mille
1931	(Census year)	...	...	433,100	15,615	30	9,129	21·
1935	...	...	...	452,554	16,713	37	10,299	23·
1936	...	...	...	463,904	18,638	39	10,683	23·
1937	...	...	...	474,775	17,664	37	9,781	21·
1938	...	...	...	481,242	21,238	44	10,575	22·

Infantile Deaths.

Year					Number	Rate per Mille
1931	..	..	..	..	1,907	122
1935	..	..	..	..	2,469	147
1936	..	..	..	..	2,667	145
1937	..	..	..	..	2,438	138
1938	..	..	..	..	2,879	131

Detailed Statistics for the year 1938 will be found listed on Page 28.

(a) Population.

The year’s population figure of 481,242 shows an increase of population but considerably less than the previous year. This is partly accounted for by the fact that the increase in the labour population on Estates was some 2,000 labourers as compared with 10,000 the previous year.

The ratio of races remained constant, Malays comprising 67%, Chinese 18% and Indians 12% of the total.

The main population in towns and villages with the exception of Alor Star, continues to be Chinese, whilst the Malays still form the majority of the rural population.

(b) Migration.

The immigrational surplus during the year 1938 amounted to 3,646, compared with the figure of 2,988 for 1937. The surplus is composed almost entirely of Chinese.

(c) The number of births registered in the State during the year was equal to a crude birth rate of 44, an increase of 7 per mille on last year’s figures. There seems little reason for this sudden increase which occurred in spite of the high endemicity of malaria, and an increased general death rate. Of the births registered during 1938, 10,397 were female and 10,841 were male, compared with 8,655 female and 9,009 male births. The male births again exceeded the female for the three principal races. There was an alteration in proportion of births registered by Malays, Chinese and Indians. The Malays registered 10 births to each 3 Chinese births, and 7 to each Indian birth being more nearly a return to the 1936 figure, and an improvement in the Malay rate. The Indian rate fell back in proportion also to the Chinese. There was a considerable increase in the total number of Malay births, and a smaller increase in all the others.

Still-births are again most marked amongst the Malays (Table IV Page 25) being 74.6% as against 73.8% in 1937. In general there was 1 still-birth to every 19 normal births as compared with 1 to 17 in 1937.

Deaths. 10,575 deaths were registered during the year giving a crude rate of 22.0, an increase of 1.4 on the 1937 figures, which is almost entirely accounted for by the increase in the Malay figures. But some 56% of this increase is due to the increase of total Malay infantile deaths.

The Male deaths predominate up to the age of 15 years. For the age periods 15 to 35 female deaths predominate, that is roughly during the productive period. After thirty five male deaths again predominate.

Roughly one quarter of the total deaths were recorded in infancy (under one year).

The principal Killing diseases amongst persons of all ages in order of frequency were:—

Disease	Approximate percentage of Crude Deaths		
	1938	1937	1936
Fever unspecified	41	36	36
Premature Birth	11	11	10
Convulsion	10	9	10
Old Age	9	9	10
Respiratory diseases (excluding T. B.)	6	4	6
Malaria	3	6	12
Bowel diseases	2	4	3

Infantile Mortality.

The crude infantile mortality rate (number of deaths under 1 year of age per 1,000 live births) over the last 7 years was as follows:—

1932	..	..	..	..	..	..	120
1933	..	..	..	..	..	..	141
1934	..	..	..	..	..	..	148
1935	..	..	..	..	..	..	148
1936	..	..	..	..	..	..	145
1937	..	..	..	..	..	..	138
1938	..	..	..	..	..	..	131

Since the 1932 figure, which is the most favourable one, this year has been the best, but it is still disconcertingly high.

Reference to the mortality figures at different age periods will show that more than 25% of the deaths occurred in the 1st week, and nearly 50% in the 1st month of life. The highest rate was again shown by the Indian Community (194) and the lowest was shared equally by the Malays and Chinese. The Indian rate has come down but is still far too high.

Reference the Indian rate 335 of 405 deaths recorded occurred amongst Estate Labour in which the infantile death rate decreased from 260 to 206 during the last twelve months.

C. PREVALENCE OF, AND CONTROL OVER, COMMUNICABLE DISEASES.

All cases of communicable diseases reported to the Health Department were fully investigated and all necessary action taken to prevent spread. No case of major communicable disease was reported during the year, and the absence of Cholera in the neighbouring State of Siam was a great relief.

All passengers from Siam were examined at the Quarantine Camp, Padang Besar.

Number of Passengers Examined:—

Class		1934	1935	1936	1937	1938
1st class	...	1,186	1,299	1,127	1,436	1,450
2nd class	...	1,179	1,675	1,432	1,408	1,611
3rd class	...	7,977	10,859	10,194	9,912	9,901
		<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
TOTAL	...	10,342	13,833	12,753	12,756	12,962
		<hr/>	<hr/>	<hr/>	<hr/>	<hr/>

Enteric.

80 cases were notified with 28 deaths.

Contacts amounting to 110 were examined and 2 were found to be carriers.

In addition 1 suspected Hawker carrier in Kuala Muda district was proved to be a carrier.

48 coolies engaged in work on the Public Water Supplies at Sungei Patani were examined for possible carriers and three were found positive. These were immediately transferred to other work.

Typhus.

8 cases were reported with 2 deaths.

Leprosy.

42 cases were investigated.

Phthisis.

The number of cases reported totalled 351 with 181 deaths.

Dysentery.

There were 519 cases with 260 deaths.

The following table indicates the incidence of reported communicable diseases by nationality for the years 1937 and 1938.

Diseases	Malays Death		Chinese Death		Indians Death		Non- Asiatic Death		Others Death		Total 1937		Total 1938	
	1937	1938	1937	1938	1937	1938	1937	1938	1937	1938	Cases	Deaths	Cases	Deaths
Fever Unspecified ...	2,762	3,394	494	622	138	202	...	...	96	107	...	3,494	...	4,325
Malaria ...	284	71	164	143	122	146	...	...	10	4	7,007	580	11,006	364
Chicken-pox ...	3	...	...	...	...	...	...	...	...	...	133	3	77	...
Enteric ...	2	13	7	6	1	9	...	...	...	...	69	10	80	28
Dysentery and Diarrhoea ...	90	47	85	59	192	151	...	...	3	3	520	370	519	260
Influenza ...	1	1	...	1	4	2	...	...	...	1	1,864	5	1,538	5
Diphtheria ...	1	2	7	1	1	1	...	...	...	...	19	9	8	4
Measles ...	...	...	...	1	...	1	...	...	...	...	1,443	26	163	2
Whooping Cough ...	...	...	...	...	...	...	...	...	...	3	54	...	68	3
Leprosy ...	...	...	...	...	...	...	...	...	...	...	40	1	32	...
Pneumonia ...	13	6	75	46	202	158	...	...	1	...	775	291	726	210
Pulmonary Tuber- culosis ...	26	35	80	92	57	51	1	...	3	3	273	167	351	181
Puerperal Fever ...	163	211	25	39	19	18	...	...	2	9	...	209	...	277
Erysipelas ...	...	...	...	1	...	...	...	...	...	1	16	1	6	2
Tetanus ...	...	...	...	1	...	2	...	...	...	...	2	1	6	3
Tropical Typhus ...	...	...	...	...	1	2	...	...	...	...	1	1	8	2
Small-pox ...	3	...	1	...	...	...	...	...	...	...	...	4	...	...
Mumps ...	...	...	...	...	...	...	...	...	...	...	340	...	160	...

Vaccinations.

In March of the year under review the responsibility for public vaccinations was handed over to this Department. The routine was reorganised, and as a result there was a considerable increase in the vaccinations carried out. Large numbers of children who had been missed in previous years were discovered and vaccinated. In addition the routine was arranged so that the vaccinator inspected all the vaccinated persons one week after vaccination. This was previously left to the Penghulu and as a consequence there was no real record of successful vaccinations. During 1937 some 27,400 vaccinations were carried out by the Health Department as a result of a small-pox scare. The routine vaccinations by the Medical Department amounted to 13,933. During 1938, the routine vaccinations by the Health Department amounted to 16,895. Of these, 14,846 were successful amounting to 87.8%.

Details are appended below:—

	No. vaccinated	No. successful	No. unsuccessful
<i>North Kedah</i>			
Hospital and District ...	5,050	4,598	452
Out-door Dispensary, Alor Star ...	835	163	672
District Yen ...	680	646	34
Out-door Dispensary, Yen ...	607	444	163
District Kubang Pasu ...	1,906	1,906	...
Out-door Dispensary, Changloon ...	156	148	8
" " Jitra ...	46	32	14
District Padang Terap ...	246	246	...
Out-door Dispensary, Kuala Nerang ...	135	120	15
<i>Langkawi</i>			
Hospital and District ...	542	407	135
<i>Central Kedah</i>			
Hospital and District Kuala Muda ...	2,835	2,533	302
" " Baling ...	1,985	1,852	133
Out-door Dispensary, Sik ...	51	39	12
<i>South Kedah</i>			
Hospital and District, Kulim ...	1,758	1,653	105
Out-door Dispensary, Bandar Bahru ...	63	59	4
Total ...	16,895	14,846	2,409

In addition 1,439 Vaccinations were done by Estate Hospitals and out of these 912 were successful giving a percentage of 63.5%. Most of the unsuccessful cases were revaccinated.

MALARIA.

Malaria in General.

Diagnosed malaria accounted for 364 deaths or 3.4% of deaths from all causes. Compared with 5.9% in 1937 while 4,689 or 44.3% of the total deaths recorded were reported as due to malaria and fevers of undefined origin (42% in 1937).

A definite epidemic of malaria is to be recorded partly due to the replanting schemes carried out on rubber estates and partly to a general seasonal increase affecting the State as a whole and the Kampongs in particular. However, the towns and villages directly under the control of this Department shewed no increase, reflecting credit on the efficiency of the Anti-Malarial Staff.

Apart from estates, dealt with in a later section, the three largest towns continued to be controlled partly by permanent drainage and partly by oiling, whilst drug prophylaxis was continued in certain small populations in dangerous areas.

Measures Adopted by the Department.

The Department directly controlled malaria in the towns of Alor Star, Sungei Patani and Kulim and the villages of Kuah and Kuala Nerang by anti-mosquito measures and in a few kampongs and cooly lines by prophylactic treatment.

The expenditure during the past 5 years was as follows:—

1934	..	..	..	..	..	..	\$10,424
1935	..	..	..	..	..	..	\$12,196
1936	..	..	..	..	..	..	\$12,600
1937	..	..	..	..	..	..	\$12,600
1938	..	..	..	..	..	..	\$16,783

Control Measures.

Oiling. Weekly oiling continued to be the main control measure. The quantity of oil used during the past 3 years was as follows:—

1936	..	..	..	..	..	15,000 gallons
1937	..	..	..	..	..	14,204 „
1938	..	..	..	..	..	13,847 „

Had it not been for the extension of anti-malarial areas effected during the year a greater saving in the quantity of oil used would have been possible. But extension of control areas is a necessity and further extensions will be carried out as funds permit.

Other Measures.

During the year under review more permanent measures were carried out than any year in the past. They are as follows:—

Subsoil piped drains (new)	..	..	..	4,184 feet.
„ „ „ (relaid)	..	..	..	508 „
Stone packed drains (new)	..	..	..	2,994 „
Old drains filled in	..	..	..	5,125 „
Cement Channels	..	..	..	1,183 „
Fascine drains	..	..	..	153 „ (semi).
Flushed	..	..	..	4,080 „ („).

In addition to the above 3,723 feet of open earth drains were also cut.

Kulim, because of its situation in a very malarious locality, was the field where more than half of the permanent measures were carried out. It is worthy of mention that a rubber estate lying within the controlled area where 16 gallons of oil were being used weekly was successfully dealt with by sub-soil pipe laying, stone packing and flushing at a cost of about \$1,400.00 contributed partly by the estate and partly by the Department. Schemes are being considered to have more private holdings in the area treated in the same manner.

At Sungei Patani it was not possible to do much in this line due to lack of funds. The hospital ravine which is one of the most dangerous areas of the town was partially dealt with by stone packing flushing and relaying of choked subsoil pipe lines. It is proposed to do more work in the area during next year.

In Alor Star nothing worthy of record was possible owing to the slender means at the disposal of the Department. *A. barbirostris*, the known carrier of the area, breeds profusely in the extensive, shaded and untreated swamps throughout the year and in rice fields during the October—January season. A start was made during the year at clearing and draining swampy areas within the town and the Government were approached to sanction a recurrent vote of \$3,000.00 to carry on the work. As indicated in last year's report nothing is practicable to control rice field breeding short of a comprehensive scheme of irrigation or serious interference with the cultivation of paddy. It is, however, interesting to record here that an experiment on a small scale was conducted to control breeding by alternate flooding and draining in a paddy field. The results obtained were a general reduction of 80 to 90% breeding and the complete absence of *A. barbirostris*. (See Appendix B for full report).

Kuah.

Almost all the seepages at the foot of the Sanatorium hill, facing the sea, have been covered by stone packing. A rice field which was situated in the middle of the village was completely drained. It was breeding *A. maculatus* intensely and had a poor crop. It is going to be used as a vegetable garden by the Malay School nearby. The village is comparatively safe now except Dundong and Penara which are out-lying areas. It is proposed to carry out protective measures in these areas during the coming year.

Shading was tried as a control measure. Of all the plants tried only *Citronella* grass shows any promise of being effective.

Larval Surveys.

Periodical larval surveys were made in all controlled areas and a few other areas where it is proposed to carry out anti-malaria measures in the immediate future.

A table detailing species, number and area caught is shown in Table IX (Page 29).

A. Sundaicus was nowhere found breeding.

A. ramayi which was recovered in an isolated pond during last year also disappeared.

Adult Catches and Dissections, see Table X (Page 29).

Among the controlled towns one infected mosquito was found at Alor Star alone. It has been mentioned earlier in the report that the control measures taken here are far from satisfactory. Catches were made at Kuala Ketil to find out the infected mosquito rate as a preliminary to starting control measures.

Malaria Incidence.

Investigations were made on all cases reported from hospitals at Alor Star, Sungei Patani and Kulim and those which were identified as fresh cases were recorded as such.

Malaria on Estates.

21,485 cases of malaria and unspecified fever were reported in 1938 as compared with 13,164 in 1937. Table XI Page 30 sums up the Malaria Statistics on Estates for the current year.

(i) *European Holdings.*

The case incidence per mille rose from 286 in 1937 to 468.5 while the malaria death rate also rose from 1.2 to 1.7. The Hospital admission rate for all fever cases rose from 58.4% to 66.8%. 9.1% of the total deaths were caused by malaria. Case fatality per centum for Hospital cases was 0.5 compared with 0.7 in 1937 whilst the lines fatality rate rose from 0.04% to 0.08%. On the whole, there was set back in Health conditions during the year.

(ii) *Asiatic Holdings.*

The population of the holdings increased by 267 during the year under review. Hospital admissions decreased from 393 to 203, and the total number of cases notified dropped from 619 to 497 in marked contrast to European Estates when there was a considerable rise. The case incidence dropped from 47 to 37. For every 1,200 cases treated in the lines on European holdings 1 died compared with 1 in 59 on Asiatic holdings. It becomes increasingly obvious that the Asiatic Estate owners are failing in their responsibilities to their employees and that measures will have to be adopted to insure more careful attention to sick employees. The matter is under the consideration of the Health Board.

D. SANITARY BOARD AREAS.

(i) *General.*

There are nine districts in the State (including one on the Langkawi Island) which have been gazetted as Sanitary Board Areas. These cover the main population centres. The general conditions prevailing are still unsatisfactory though much has been done and is being done to improve conditions. Present Legislation is inadequate to deal with conditions and new by-laws are under consideration.

(ii) *Sewage Disposal.*

Little has been done to improve the method of Sewage Disposal which still remains a dangerous feature of the towns in Kedah. Hand carriage after removal still remains, and as a consequence a considerable quantity of nightsoil finds its way into the drain and streams. Supervision has improved, but the present system does not lend itself to adequate supervision.

Once again the scheme for last year has been reconsidered. A visit to the Penang Sewage Works suggested the adoption of similar scheme in Kedah. At present the matter is under consideration.

(iii) *Refuse Disposal.*

Of the larger towns Alor Star and Sungei Patani have modern incinerators and one is under construction in Kulim. Most of the smaller villages have small incinerators sufficient for their needs.

Improvement in street scavenging during the year resulted from a modification of the present system. All public bins were removed in the shophouse areas, and each shophouse was called upon to provide a suitable bin for its own use. Orderly carts for street sweeping were introduced. At first there was some difficulty with the shopkeepers, but they soon adapted themselves. Alor Star still remains the greatest problem owing to the considerable amount of street trading that is carried on. Further improvement in the cleanliness of the street is impossible whilst the street-trading persists.

(iv) *Water Supplies.*

Considerable attention was devoted to the improvement of water supplies during the year. The provision of filtered and chlorinated supplies to all the big towns should be possible in the near future. Analysis of present supplies can only be described as highly unsatisfactory. The absence of any epidemic traced to such supplies is no promise that the future will be as happy. During the year all coolies and other P.W.D. employees in any way connected with the Kuala Muda Government Water Supply were systematically examined for possible typhoid carriers by the Pathological Department.

The results of the investigation were as follows:—

Number examined.	Urine Positive.	Faeces Positive.
48	3	Nil.

4 coolies were found with an agglutination of 1/25, but in only one case was *B. typhosus* isolated from the urine. The remaining two urinary cases showed no agglutination.

Such high positive findings are unknown elsewhere in Malaya and carriers are seldom found more than once in several hundreds examined. The incidence of typhoid may be slightly higher in Kedah than in the rest of Malaya, but this can hardly account for the enormous difference in the carrier rate.

Schemes are also under consideration for an extension of supplies to rural dwellers. Such schemes must necessarily be expensive, and slow in development, but the plans are nearing fruition, and results should accrue in the near future.

(v) *Drainage.*

Some improvement in the present unsatisfactory drainage was achieved during the year. With a regular programme of drain construction, the position should be vastly improved in a few years.

(vi) *Housing and Town Planning.*

The work was continued and layouts were prepared. One village in South Kedah was almost entirely gutted, and a new layout was prepared in a few days so as to anticipate the rebuilding.

Demolition of old and insanitary houses was continued, adequate notice being given to owners in all cases, where the actual danger of collapse was not imminent.

(vii) *Food in Relation to Health and Disease.*

(a) Considerable anxiety was caused during the year by the sudden growth in Kampong areas of small motor rice mills, which produce a highly polished rice. In the past, the home undermilled rice consumed by the 'raayats' has been their only appreciable source of Vitamin B, and even then minor deficiency diseases were much in evidence although frank cases of beri-beri have been rare amongst Kampong Malays.

Now, that polished rice is being produced in the Kampongs it is anticipated that not only will minor deficiencies and the infantile death rate increase, but beri-beri will become common. Vigorous steps are being taken to combat the danger by means of propaganda, but there seems little reason why Government regulation should not prohibit the production of polished rice for consumption in the State of Kedah in the same way as skimmed milk is prohibited from importation. Both foods are a considerable potential danger to the health of a poor population with a limited diet.

(b) *Slaughter Houses.*

The present slaughter houses though much improved are still unsatisfactory. No provision has yet been made for their replacement.

(c) *Restaurants and Eating Shops.*

All these were subject to examination and licensing and a very considerable improvement resulted. They are still far from satisfactory, and there can be little hope of achieving a satisfactory standard whilst they have to compete with the street stalls and hawkers.

(d) *Street Stalls and Hawkers.*

Street Stalls caused the usual trouble in control. It can never be accepted that any of them will at any time be satisfactory, and whilst they exist the standard of the eating shops will remain low. To raise the standard of the street stall is well nigh impossible, as one cannot provide the facilities necessary for cleanliness on a structure of this type. From the health point of view they are a danger to the public serving as they do food of doubtful cleanliness. They are also a frequent source of traffic obstruction both vehicular and pedestrian. There can be no question but that the trade is a very lucrative one, even more lucrative than the average eating shop, and as a consequence not only are the public endangered by the food they supply, but it is impossible to achieve a suitable standard in the eating shops whilst the street-stall continues. Hawkers offer a greater problem, owing to their even more restricted capacity for cleanliness. Restriction of their trade to the sale of fruits and vegetables would eliminate a considerable amount of risk to public health, but it is doubtful whether a living could be obtained thereby. Their gradual and complete elimination is desired.

(e) *Bakeries.*

More stringent regulations to control all bakeries are enforced. Unfortunately there are few premises suitable for the purpose. Provision for such new premises in Alor Star has been approved for 1939.

(f) *Legislation.*

No Food and Drugs Enactment as yet exists in the State of Kedah. Draft Legislation is at present under consideration, and it is to be hoped that it will be passed in the near future. At present no control exists over any food production outside Sanitary Board Limits, and none over such factories as ice or aerated waters within the Sanitary Board.

E. CONTROLLED BUILDING AREAS.

Considerable extension was made through-out the State to areas where building could be controlled outside Sanitary Board areas. A strip on each side of all main roads has been included in the Controlled Building Areas to prevent the present tendency of erecting insanitary hovels along our main traffic routes. It will also prevent the development of very cheap type shophouses immediately adjoining a decent village, and will thus protect the village from insanitary conditions arising on its outskirts and also harmful competition.

F. KAMPONG AND RURAL AREAS.

This is a subject on which a special report is appended vide Appendix "A".

G. GOVERNMENT DEPARTMENTS.

Police Stations and other Government Quarters were inspected as circumstances and staff offered. Marked improvements were made in the housing of Government labourers.

H. During the year, the sites of 45 Burial Grounds have been inspected at the request of the Land Office.

(I) INDUSTRIAL HYGIENE.

(a) *Rubber Estates.*

The Kedah Health Board schemes for Estates continued to function smoothly.

Special consideration was given to methods which would encourage a greater use in the facilities for treatment of disease at present in existence. In addition a scheme was submitted for infant welfare and anti-natal work on one group as an experiment.

There are 83 European owned Estates and 6 Asiatic Estates known to this Department. These are distributed as follows:—

(i) *European Owned.*

North Kedah	..	..	..	..	..	..	9
Central Kedah	..	..	..	..	..	..	40
South Kedah	..	..	..	..	..	..	34

(ii) *Asiatic Owned.*

North Kedah	..	..	..	..	..	..	31
Central Kedah	..	..	..	..	..	..	211
South Kedah	..	..	..	..	..	..	148

Of these nearly all European Estates were visited at least once during the year.

Of the Asiatic Estates all were visited and the total visits including revisits to follow up the results of recommendations and orders amounted to 1,749. A large amount of extra work is entailed in supervising Asiatic Estates owing to their failure to come forward and discuss the recommendations made.

In this respect the figures for revisits, orders issued, and prosecutions resulting therefrom, speak for themselves.

No. of Orders Issued.	No. of Prosecution.	No. of Conviction.
409	28	11

(iii) *Housing.*

53 Estates erected new lines during the year and in addition 6 submitted plans which were approved for lines to be built during the coming year.

The type of lines usually built is of the ground type with a single row of rooms, each with its own verandah and enclosed kitchen. As a result of recommendations from the Controller of Labour, Malaya, an improvement in the type was asked for. No kongsi houses were allowed for Chinese Labour, following the decision made in 1937.

(iv) *Water Supplies.*

Two European Estates extended piped water supplies during the year. New protected wells were constructed on several others.

(v) *Sewage Disposal.*

4 Estates installed septic tank flush latrines in addition to the 10 already in existence. There were several enquires from other estates regarding this type of latrine. The majority of estates use pit latrines except where the ground water is too high to allow of it, where they use bucket latrines.

(vi) *Anti-Malarial Work.*

Table XI page 30 shows the incidence of Malaria on Estates. The considerable increase of malaria on Estates was referred to earlier.

Weekly anti-malarial oiling is carried out on the majority where malaria exists and on many estates chemio prophylaxis is enforced during the malaria season.

No new Health Board Anti-Malaria oiling schemes were instituted during the year.

The safety of the half mile radius protected zone was severely questioned during the year when clearing and felling of old rubber trees, made it obvious that the mosquito was quite capable of flying up to two miles for a blood feed, and there is no doubt but that this was a cause in many cases of outbreaks of malaria where ordinarily the anti-malarial work was efficiently carried out.

(vii) *Group Hospitals.*

All the Group Hospitals were visited during the year. Proposals to extend one Hospital was submitted to the Health Board.

(viii) *Infectious Diseases.*

No outbreak of any note occurred during the year in contrast with 1937 when measles was responsible for an increase in Broncho Pneumonia with a high mortality rate. The usual enquiry into deaths occurring in the lines was made.

(II) MILLS AND MINES.

22 Sago and Rice Mills were inspected during the year in pursuance of the policy of demanding a reasonable standard of housing and sanitation for these places.

All quarries worked by the Contractors to Government were inspected during the year. As a result of drawing the attention to Government of the unsatisfactory housing of most labourers at quarries, provision is being made for the construction of suitable lines which will be rented to the Contractor each year.

(III) VITAL STATISTICS ON ESTATES.

Tables XIV A and B; XV A, B, C, D and E; XVI A, B, C, D and E; XVII; XVIII; XIX; XX; XXI and XXII A and B show the Vital Statistics for Rubber Estates. There was an increase in Estate population both on European and Asiatic Estates. The former showed an increase of 2,022 and the latter a small increase of 267.

In spite of the epidemic of malaria, the total death rate decreased by 2 per mille to 15.4. The death rate for Indian Labourers on European holding rose from 8.6 to 9.6, and the saving in life was obviously amongst children and dependants.

On European Estates the Infantile Mortality fell from 255 in 1937 to 212 in 1938. The drop was common to all nationalities, and the decrease was noted on Asiatic Estates. The Infantile Mortality rate is still very high and is a strong indication of the necessity for more care of infant life. Proposals have been submitted to the Kedah Health Board to carry out Infant Welfare Work on one group of estates during 1939.

(IV) MALARIA.

The malaria statistics show an increased malaria rate from 231.3 to 377.7. The increase was due to a rise in the rate generally throughout the State and an additional rise due to replanting. No corresponding increase was noted in the towns controlled by the Health Department, nor on Asiatic Estates where the rate dropped from 47.4 to 37.3. The reason for the latter is most probably due to the strong disinclination of Asiatic owners to bear the cost of treatment during the present comparatively depressed economic situation.

(V) SCHOOLS.

During the year all Malay Schools not visited as well as some that had been visited during 1937 were inspected, and brief talks were given to the children on health matters after each inspection. Tables XII and XIII attached shows the result of these inspections. The Health Officer paid visits to certain schools with regard to the sites for new buildings and wells.

(A) *Malay Schools Visited.*

61 Malay Schools were visited during the year. These had water supply as follows:—

Piped supply	Protected wells	Earth wells	River	Rain	None of any kind	Total
8	39	2	7	3	2	61

(B) *Latrines.*

The type latrine accommodation of these schools was as follows:—

Bucket	Trench or pit	Mound	Surface	None	Total
22	20	18	1	...	61

Recommendations were made for 2 new school buildings, 4 bucket latrines, 6 pit latrines, 3 mound latrines, 8 concrete latrine seats and remedying of various minor defects.

Several Chinese Schools were inspected with regard to their suitability as schools at the request of the Registrar of Schools. Chinese Schools, however, are not subject to routine visits by this Department.

LIST OF TABLES.

(FOR PART III)

	<i>Page.</i>
I. .. Comparative Population figures by Race	25
II. .. Approximate Population, Births, Deaths and Infantile Mortality for the Chief Towns in the State	25
III. .. Summary of Births and Birth Rate by Race and Sex	25
IV. .. Summary of Still Births by Race and Sex	25
V. .. Summary of Deaths and Death Rates by Race and Sex	26
VI. .. Summary of Deaths Grouped according to Age, Sex and Nationality	26
VII. .. Principal Causes of Deaths by Ages and Sex of All Nationalities for 1938	27
VIII. .. Infantile Mortality by Race and Sex	28
IX. .. Table Showing Larvae Collected and Identified During 1938	29
X. .. Table Showing Mosquito Adults Caught and Dissected During 1938	29
XI. .. Malaria Statistics	30
XII. .. Schools	30
XIII. .. Spleen Rates by Districts among Malay School Children, 1937 and 1938	30
XIV—A. .. Population on European Holdings	31
XIV—B. .. Population on Asiatic Holdings	31
XV—A. .. Deaths on European Holdings (outside Hospital)	31
XV—B. .. Deaths in Group Hospitals from European Holdings	32
XV—C. .. Deaths in Government Hospitals from European Holdings	32
XV—D. .. Death Rates from European Holdings	32
XV—E. .. Labourer Death Rates from European Holdings	33
XVI—A. .. Deaths from Asiatic Holdings	33
XVI—B. .. Deaths in Group Hospital from Asiatic Holdings	33
XVI—C. .. Deaths in Government Hospitals from Asiatic Holdings	34
XVI—D. .. Death Rates from Asiatic Holdings	34
XVI—E. .. Labourers Death Rates from Asiatic Holdings	34
XVII. .. Comparative Tables for Total Estate Population Showing Total Deaths and Death Rates for the Years 1936, 1937 and 1938	35
XVIII—A. .. Figures Showing Prevailing Diseases Among Estate Populations Admitted into Government Hospital in Kedah from European and Asiatic with Deaths by Months	36
XVIII—B. .. Figures Showing Prevailing Diseases Among Estate Populations Admitted into Group Hospitals in Kedah from European and Asiatic Holdings with Deaths by Months	37
XIX. .. Record of Broncho Pneumonia and Pneumonia (Unspecified) Admitted into Government and Group Hospitals for the year, 1938	38
XX. .. Record of Measles Cases Admitted into Government and Group Hospitals from European and Asiatic Estates	39
XXI. .. Hospitals Admissions from Estates	39
XXII—A. .. Birth Rates and Infantile Mortality Rates on European Estates	39
XXII—B. .. Birth Rates and Infantile Mortality Rates on Asiatic Estates	40

TABLE I.

Comparative Population Figures by Race.

Race			1st April CENSUS 1921	1st April CENSUS 1931	Mid-year 1938
Malays	...	...	237,031	286,262	323,327
Chinese	...	...	59,403	78,415	86,843
Indians	...	...	33,004	50,824	57,060
Non-Asiatics	...	...	300	411	699
Others	...	...	8,820	13,779	13,313
Total ...			338,558	429,691	481,242

TABLE II.

Approximate population, Births, Deaths and Infantile Mortality for the Chief Towns in the State.

Town			Population	BIRTHS		DEATHS		INFANTILE DEATHS	
				Number	Rate per mille	Number	Rate per mille	Number	Rate per mille
Alor Star	...	...	25,354	984	39	512	20	121	123
Sungei Patani	...	...	10,575	653	62	382	36	73	112
Kulim	...	...	7,711	406	53	287	37	74	182

TABLE III.

Summary of Births and Birth Rates by race and sex.

Race				Males	Females	Total	Rate per mille
Malays	...	...	...	7,453	7,103	14,556	45
Chinese	...	...	...	2,206	2,094	4,300	48
Indians	...	...	...	1,050	1,042	2,092	37
Non-Asiatics	...	...	...	2	3	5	7
Others	...	...	...	130	155	285	22
Total ...				10,841	10,397	21,238	44

TABLE IV.

Summary of Still-births by race and sex.

Race				Males	Females	Total
Malays	...	...	...	458	369	827
Chinese	...	...	...	86	60	146
Indians	...	...	...	78	43	121
Non-Asiatics	...	...	...	...	...	...
Others	...	...	...	12	2	14
Total ...				634	474	1,108

TABLE V.

Summary of Deaths and Death Rates by race and sex.

Race				Males	Females	Total	Rate per mille
Malays	...	...	...	3,638	3,353	6,991	22
Chinese	...	...	...	1,320	700	2,020	23
Indians	...	...	...	727	633	1,360	24
Non-Asiatics	...	...	...	1	1	2	3
Others	...	...	...	100	102	202	15
Total				5,786	4,789	10,575	22

TABLE VI.

Summary of Deaths grouped according to age, sex and nationality.

Age				Sex	Europeans	Eurasians	Chinese	Malays	Indians	Others	Total
0	...	...	{	M	...	...	141	475	115	6	737
				F	...	...	111	347	77	6	541
4 weeks	...	...	{	M	...	1	76	281	36	2	396
				F	...	...	58	222	30	2	312
3 months	...	...	{	M	...	...	44	130	21	3	198
				F	...	...	44	150	38	1	233
6	„	...	{	M	...	...	42	155	38	4	239
				F	...	...	41	129	50	3	223
1 year	...	...	{	M	...	...	82	474	87	7	650
				F	...	...	106	472	108	10	696
5 years	...	...	{	M	...	...	43	196	22	3	264
				F	...	...	54	210	32	9	305
10	„	...	{	M	...	...	24	90	14	5	133
				F	...	...	24	76	8	5	113
15	„	...	{	M	...	...	15	88	9	...	112
				F	...	1	15	78	15	1	110
20	„	...	{	M	...	...	37	87	34	3	161
				F	...	...	28	137	35	1	201
25	„	...	{	M	...	...	35	90	32	3	160
				F	...	...	22	116	52	6	196
30	„	...	{	M	...	...	65	146	51	6	268
				F	...	...	25	183	43	4	255
35	„	...	{	M	...	...	76	111	61	6	254
				F	...	...	39	123	35	6	203
40	„	...	{	M	...	...	75	182	53	2	312
				F	...	...	30	125	24	4	183
45	„	...	{	M	...	...	96	108	38	7	249
				F	...	...	26	78	16	9	129
50	„	...	{	M	...	...	117	172	30	7	326
				F	...	...	12	114	15	3	144
55	„	and over	{	M	...	...	352	853	86	37	1,328
				F	...	...	65	793	55	31	944
TOTAL M. F.				...	...	2	2,020	6,991	1,360	202	10,575

TABLE VII.

PRINCIPAL CAUSES OF DEATHS BY AGES, SEX OF ALL NATIONALITIES.

CAUSES OF DEATH FOR THE YEAR OF 1938.

	Malaria		Fever Unspecified		Enteric Fever		Dysentery		Influenza		Bronchitis		Pneumonia (all forms)		Tuberculosis of Respiratory System		Other forms of Tuberculosis		Other Diseases of Respiratory System		Syphilis		Diseases of Nervous System and Sense-organs		Ankylostomiasis		Diarrhoea and Enteritis		Beriberi		Diseases of the Heart		Other Diseases of Circulatory System		Convulsions		Non-Veneral Diseases of Genito-Urinary System		Diseases of Pregnancy and Childbirth and Puerperal State		Premature Births and Diseases of Early Infancy		Old age and Senility		Violence (all forms)		Other Causes		GRAND TOTAL																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
Under 1 week ...	1	...	9	7	1	1</

TABLE VIII.

Infantile Mortality by race and sex.

Race				Males	Females	Total	Rate per mille
Malays	...	...	...	1,041	848	1,889	130
Chinese	...	...	...	303	254	557	130
Indians	...	...	...	210	195	405	194
Non-Asiatics	...	...	...	1	...	1	200
Others	...	...	...	15	12	27	95
Total				1,570	1,309	2,879	131

TABLE IX.

TABLE SHOWING LARVAE COLLECTED AND IDENTIFIED DURING 1938.

STATION	Barbiros- tris	Sinensis	Nigerr- mus	Vagus	Philippi	Annularis	Umbrosus	Kochi	Tesselatus	Separatus	Aconitus	Aitkeni	Supictus Malayensis	Maculatus	Karwari	Baezai	Leucos- phyrn	Novum- brosus	TOTAL.
Alor Star	264	841	1337	2252	38	6	...	37	...	4	...	...	5	...	...	...	...	...	4784
Sungei Patani	26	329	1414	789	129	2	...	279	72	...	9	...	3	174	18	...	...	...	3244
Kulim	878	786	558	1237	272	...	...	35	3	...	...	...	...	57	130	...	...	...	3956
Langkawi	3	...	2	17	29	...	...	6	2	...	3	14	...	51	152	34	5	...	318
Kuala Nerang	58	4	6	122	...	...	...	282	16	...	15	...	...	60	122	...	2	...	687
Gajah Mati	...	7	14	15	...	...	4	11	...	1	...	...	...	77	208	...	...	...	337
Kuala Ketil	76	...	9	...	...	...	127	10	...	3	...	...	...	...	...	...	...	2	227
TOTAL	1305	1967	3340	4432	468	8	131	660	93	8	27	14	8	419	630	34	7	2	13,553

TABLE X.

TABLE SHOWING MOSQUITO ADULTS CAUGHT AND DISSECTED DURING 1938.

STATION	Barbiros- tris	Sinensis	Nigerr- mus	Vagus	Philippi- nensis	Annularis	Kochi	Tesselatus	Aconitus	Subpictus Malaye- nensis	Baezai	Maculatus	Karwari	Umbrosus	TOTAL	
Alor Star	106	238	438	1024	124	3	1	3	...	3	1	...	...	...	1941	1. Barbirostris infected.
Sungei Patani	13	208	1136	231	56	13	9	46	2	1	...	1	...	1	1717	Nil.
Kulim	48	226	729	364	15	46	48	39	26	...	...	4	32	...	1713	Nil.
Kuala Ketil	...	...	...	...	...	...	...	...	...	...	...	...	...	404	404	3. Umbrosus infected.
TOTAL	167	672	2303	1619	331	62	58	88	28	4	1	5	32	405	5,775	4. Infected.

Umbrosus .74% infected.

Barbirostris

.6% infected.

TABLE XI.
Malaria Statistics.

Holdings	Population	Cases notified			Malaria deaths			Total deaths (all cases)			Percentage cases admitted to Hospital	Case incidence per mille	Case fatality percentage			Percentage malaria deaths to total deaths			Malaria deaths rate per mille
		Hospital	Lines	Total	Hospital	Lines	Total	Hospital	Lines	Total			Hospital	Lines	Total	Hospital	Lines	Total	
European	45,864	14,268	7,217	21,485	73	6	79	699	171	870	66·8	468·45	·51	·08	·37	10·44	3·51	9·08	1·72
Asiatic	13,328	203	294	497	4	5	9	22	19	41	40·8	37·3	1·97	1·70	1·81	18·18	1·32	21·95	·68
Total	58,192	14,471	7,511	21,982	77	11	88	721	190	911	65·8	377·7	·53	·15	·40	10·68	5·79	9·66	1·51

TABLE XII.
SCHOOLS.

Number of Malay Schools registered ..	..	..	..	87
Number of Malay Schools inspected ..	..	..	..	61
Number of Pupils on register ..	..	..	..	8,078
Number of Pupils examined ..	..	..	..	7,061

Diseases					No. of Cases		Percentage	
Malaria :	Spleen palpable	...	...	...	368		5·21	
	Obvious Anæmia	...	...	...	188		2·66	
Yaw :	Untreated	...	...	...	71		1·01	
	Undergoing treatment	...	...	...	19		0·27	
Unvaccinated		...	...	...	160		2·27	
Eyes :	Conjunctivitis	...	...	...	14		0·20	
	Other diseases	...	...	...	5		0·07	
Ear diseases		...	...	...	45		0·64	
Skin :	Scabies	...	...	...	387		5·48	
	Tinea	...	...	...	437		6·19	
	Other skin diseases	...	...	...	252		3·57	
	Dental caries	...	...	...	2,502		35·43	
	Suspected worms	...	...	...	331		4·69	
	Pediculosis	...	...	...	50		0·71	
	Other diseases	...	...	...	...		...

TABLE XIII.
Spleen Rates by Districts among Malay School Children 1937 and 1938.

Districts		No. of children examined		No. of children with enlarged spleens		Spleen rate	
		1937	1938	1937	1938	1937	1938
Kubang Pasu	...	280	1,061	8	40	2·85	3·77
Padang Terap	...	...	95	...	7	...	7·37
Kota Star	...	2,059	1,176	53	34	2·57	2·89
Kulim	...	263	818	12	27	4·56	3·30
Bandar Bharu	...	342	538	12	24	3·48	4·46
Baling	...	441	1,025	29	109	6·58	10·63
Kuala Muda	...	963	2,090	51	112	5·30	5·36
Yen	...	113	262	19	15	13·28	5·73
Langkawi	...	525	...	22	...	4·19	...

TABLE XIV—A.

Population on European Holdings.

Nationalities			Labourers		Dependents			Total
			Males	Females	Adults	Children	Infants	
Malays	...	...	2,285	1,028	326	1,040	235	4,914
Indians	...	...	16,287	7,743	2,806	9,192	3,153	39,181
Chinese	...	...	962	157	200	239	49	1,607
Javanese	...	...	15	6	5	7	2	35
Others	...	...	60	...	43	21	3	127
Total	...	...	19,609	8,934	3,380	10,499	3,442	45,864

TABLE XIV—B.

Population on Asiatic Holdings.

Nationalities			Labourers		Dependents			Total
			Males	Females	Adults	Children	Infants	
Malays	...	...	3,186	2,349	284	1,330	216	7,365
Indians	...	...	1,198	370	210	322	84	2,184
Chinese	...	...	2,268	434	279	539	130	3,650
Javanese	...	...	18	12	1	6	...	37
Others	...	...	60	13	12	7	...	92
Total	...	...	6,730	3,178	786	2,204	430	13,328

TABLE XV—A.

Deaths on European Holdings (outside Hospital).

Nationalities			Labourers		Dependents			Total
			Males	Females	Adults	Children	Infants	
Malays	...	...	2	1	1	2	13	19
Indians	...	...	11	4	24	18	89	146
Chinese	...	...	3	1	...	...	2	6
Javanese	...	...	...	...	...	...	...	...
Others	...	...	...	...	...	...	...	...
Total	...	...	16	6	25	20	104	171

Still-Births on European Holdings.

Nationalities.							No. of Still-Births.	
Malays	..	..	..	..	..	..	..	..
Indians	..	..	..	..	..	..	..	4
Chinese	..	..	..	..	..	..	..	..
Javanese	..	..	..	..	..	..	..	..
Others	..	..	..	..	..	..	..	..
							Total	.. 4

TABLE XV—B.

Deaths in Group Hospitals from European Holdings.

Nationalities			Labourers	Dependents			Total Deaths
				Adults	Children	Infants	
Malays	...	...	...	...	...	1	1
Indians	...	...	184	68	148	234	634
Chinese	...	...	1	3	...	...	4
Javanese	...	...	...	...	...	...	...
Others	...	...	1	...	...	...	1
Total			186	71	148	235	640

TABLE XV—C.

Deaths in Government Hospitals from European Holdings.

Nationalities			Labourers	Dependents			Total Deaths
				Adults	Children	Infants	
Malays	...	...	...	...	...	...	...
Indians	...	...	32	2	14	8	56
Chinese	...	...	1	1	...	1	3
Javanese	...	...	...	...	...	...	...
Others	...	...	...	...	...	...	...
Total			33	3	14	9	59

TABLE XV—D.

Death Rates from European Holdings.

Nationalities				Total population	Total deaths	Death rates
Malays	...	...	...	4,914	20	4·07
Indians	...	...	...	39,181	836	21·34
Chinese	...	...	...	1,607	13	8·09
Javanese	...	/	...	35	...	...
Others	...	...	...	127	1	7·87
Total				45,864	870	18·97

TABLE XV—E.

Labourer Death Rates from European Holdings.

Nationalities				Total labourers	Total deaths	Death rates
Malays	...	...	...	3,313	3	0·91
Indians	...	...	...	24,030	231	9·61
Chinese	...	...	...	1,119	6	5·36
Javanese	...	...	...	21	...	...
Others	...	...	...	60	1	16·67
Total ...				28,543	241	8·44

TABLE XVI—A.

Deaths from Asiatic Holdings.

Nationalities				Labourers		Dependents			Total deaths
				Males	Females	Adults	Children	Infants	
Malays	...	...	...	...	...	...	2	4	6
Indians	...	...	...	3	1	1	...	4	9
Chinese	...	...	...	1	...	1	2	...	4
Javanese	...	...	...	...	...	...	...	...	...
Others	...	...	...	...	...	...	...	...	...
Total ...				4	1	2	4	8	19

Still-births on Asiatic Holdings.

Malays	..	..	..	..	..	..	..	1
Indians	..	..	..	..	..	..	..	1
Chinese	..	..	..	..	..	..	..	..
Javanese	..	..	..	..	..	..	..	..
Others	..	..	..	..	..	..	..	..
Total								2

TABLE XVI—B.

Deaths in Group Hospitals from Asiatic Holdings.

Nationalities				Labourers	Dependents			Total
					Adults	Children	Infants	
Malays	...	...	...	1	...	...	...	1
Indians	...	...	...	4	2	...	4	10
Chinese	...	...	...	6	2	...	...	8
Javanese	...	...	...	...	...	...	...	...
Others	...	...	...	...	...	...	...	...
Total ...				11	4	...	4	19

TABLE XVI—C.

Deaths in Government Hospitals from Asiatic Holdings.

Nationalities			Labourers	DEPENDENTS			Total
				Adults	Children	Infants	
Malays	...	...	...	...	...	...	...
Indians	...	...	2	...	...	1	3
Chinese	...	...	...	...	...	...	...
Javanese	...	...	...	...	...	...	...
Others	...	...	...	...	...	...	...
Total			2	...	...	1	3

TABLE XVI—D.

Death Rates from Asiatic Holdings.

Nationalities				Population	Deaths	Death rates
Malays	...	...	...	7,365	7	0·95
Indians	...	...	...	2,184	22	10·07
Chinese	...	...	...	3,650	12	3·29
Javanese	...	...	...	37	...	...
Others	...	...	...	92	...	...
Total				13,328	41	3·08

TABLE XVI—E.

Labourers Death Rates from Asiatic Holdings.

Nationalities				Population	Labourers	Death rates
Malays	...	...	...	5,535	1	0·18
Indians	...	...	...	1,568	10	6·38
Chinese	...	...	...	2,702	7	2·59
Javanese	...	...	...	30	...	...
Others	...	...	...	73	...	...
Total				9,908	18	1·82

TABLE XVII.

Comparative Tables for total Estate population showing total Deaths and Death Rates for the years 1936, 1937 and 1938.

1936.

No.	Class of Estates	Population	Death in lines	Deaths in Hospital		Total Deaths	Death Rates	Total Death Rates
				Govt.	Group			
1	European owned ...	36,016	169	45	477	691	19·2	...
2	Asiatic ,, ...	10,719	47	2	20	69	6·4	...
	Total ...	46,735	216	47	497	760	...	16·3

1937.

No.	Class of Estates	Population	Death in lines	Death in Hospital		Total Deaths	Death Rates	Total Death Rates
				Govt.	Group			
1	European owned ...	43,842	179	42	717	938	21·4	...
2	Asiatic ,, ...	13,061	28	4	20	52	3·98	...
	Total ...	56,903	207	46	737	990	...	17·4

1938.

No.	Class of Estates	Population	Death in lines	Deaths in Hospital		Total Deaths	Death Rates	Total Death Rates
				Govt.	Group			
1	European owned ...	45,864	171	59	640	870	18·97	...
2	Asiatic ,, ...	13,328	19	3	19	41	3·08	...
	Total ...	59,192	190	62	659	911	...	15·39

TABLE XVIII—A.

Figures showing Prevaling Diseases Among Estate Populations Admitted into Government Hospital in Kedah
from European and Asiatic Estates with Deaths by Months.

MONTHS		MALARIA		ANKYLOSTOMIASIS		DYSENTERY		OTHER BOWEL DISEASES		PNEUMONIA		OTHER DISEASES		TOTAL	
		Deaths		Deaths		Deaths		Deaths		Deaths		Deaths		Deaths	
		Admis-sions	Deaths	Admis-sions	Deaths	Admis-sions	Deaths	Admis-sions	Deaths	Admis-sions	Deaths	Admis-sions	Deaths	Admis-sions	Deaths
JANUARY	...	20	...	1	...	...	...	1	...	1	1	80	3	103	4
FEBRUARY	...	6	...	...	...	...	...	4	...	3	2	73	...	86	2
MARCH	...	3	1	1	...	...	...	...	...	4	2	79	5	87	8
APRIL	...	10	2	4	...	...	...	...	...	1	2	90	4	105	8
MAY	...	12	1	4	...	2	...	...	...	1	...	91	7	110	8
JUNE	...	17	1	3	...	...	1	3	...	1	1	101	2	125	5
JULY	...	7	...	...	...	...	...	3	1	2	...	74	4	88	5
AUGUST	...	6	1	1	...	...	...	5	...	1	1	77	3	90	5
SEPTEMBER	...	5	...	1	...	...	...	1	1	3	1	72	2	82	4
OCTOBER	...	2	1	3	...	...	...	...	...	3	...	72	5	80	6
NOVEMBER	...	8	2	4	1	1	...	1	...	2	1	94	...	110	4
DECEMBER	...	9	1	4	...	...	...	1	...	3	...	85	2	101	3
TOTAL		105	10	26	1	3	1	19	2	25	11	988	37	1,167	62

TABLE XVIII—B.

Figures Showing prevailing Diseases among Estate populations admitted into Group Hospitals in Kedah from European and Asiatic Estates with Deaths by Months.

MONTHS		MALARIA		ANKYLOS-TOMIASIS		DYSENTERY		OTHER BOWEL DISEASES		PNEUMONIA		OTHER DISEASES		TOTAL	
		Admiss-ions	Deaths	Admiss-ions	Deaths	Admiss-ions	Deaths	Admiss-ions	Deaths	Admiss-ions	Deaths	Admiss-ions	Deaths	Admiss-ions	Deaths
JANUARY	...	...	6	24	...	31	5	57	4	37	10	1,051	43	1,934	68
FEBRUARY	...	...	5	13	...	25	1	30	7	47	11	946	27	1,730	51
MARCH	...	...	4	19	...	22	...	37	7	55	14	1,156	14	2,266	39
APRIL	...	...	7	11	...	26	2	55	12	53	14	1,445	31	3,297	66
MAY	...	...	11	22	...	34	6	49	2	41	14	1,565	34	3,809	67
JUNE	...	...	12	18	1	43	10	50	7	54	16	1,605	27	3,968	73
JULY	...	...	9	9	...	29	3	54	3	39	8	1,236	26	2,937	49
AUGUST	...	...	4	15	2	41	6	51	1	36	7	1,030	32	2,326	52
SEPTEMBER	...	...	2	25	...	21	5	59	5	59	11	998	27	2,037	50
OCTOBER	...	...	3	17	...	18	3	56	6	41	9	1,051	32	2,001	53
NOVEMBER	...	...	...	16	...	15	3	59	7	73	9	1,258	25	2,172	44
DECEMBER	...	...	2	29	...	18	1	54	2	38	12	1,090	30	1,931	47
TOTAL		14,252	65	218	3	323	45	611	63	573	135	14,431	348	30,408	659

TABLE XIX.

Record of Broncho Pneumonia and Pneumonia (Unspecified) admitted into Government and Group Hospitals for the year 1938.

MONTHS		GOVERNMENT HOSPITALS										GROUP HOSPITALS.									
		EUROPEAN ESTATES					ASIATIC ESTATES.					EUROPEAN ESTATES.					ASIATIC ESTATES				
		Broncho Pneumonia		Pneumonia Unspecified.		Deaths	Broncho Pneumonia		Pneumonia Unspecified.		Deaths	Broncho Pneumonia		Pneumonia Unspecified.		Deaths	Broncho Pneumonia		Pneumonia Unspecified.		Deaths
		Admis-sions	Deaths	Admis-sions	Deaths		Admis-sions	Deaths	Admis-sions	Deaths		Admis-sions	Deaths	Admis-sions	Deaths		Admis-sions	Deaths	Admis-sions	Deaths	
JANUARY	...	1	...	1	...	...	...	...	...	...	...	20	4	9	2	...	...	...	...	...	...
FEBRUARY	...	...	...	3	1	...	...	...	...	...	...	17	4	22	5	1	...	...	1	...	...
MARCH	...	...	...	1	1	...	1	1	...	...	...	23	4	24	10	...	...	...	1	...	...
APRIL	...	1	1	...	...	...	...	...	...	...	...	32	5	32	5	...	...	...	2	...	...
MAY	...	...	...	1	...	...	...	...	...	...	...	21	5	23	5	3	...	...	2	1	...
JUNE	...	1	1	...	...	...	...	...	...	...	...	32	9	25	5	1	...	...	1	...	...
JULY	...	1	...	1	...	...	...	...	...	...	...	11	2	17	3	...	...	...	2	...	...
AUGUST	...	...	...	1	1	...	...	...	...	...	...	13	3	20	3	...	...	...	2	...	...
SEPTEMBER	...	2	...	...	...	...	...	...	...	...	...	18	3	29	6	...	...	...	1	1	...
OCTOBER	...	2	...	1	...	...	...	...	...	...	...	16	4	14	2	...	...	...	1	1	...
NOVEMBER	...	2	1	...	...	...	...	...	...	...	...	26	3	42	5	...	...	...	...	...	...
DECEMBER	...	2	...	...	...	...	...	...	...	...	...	13	3	24	4	...	...	...	1	...	...
TOTAL		12	3	9	3	...	1	1	...	...	...	242	49	281	55	5	...	...	14	3	...

TABLE XX.

Record of Measles cases admitted into Government and Group Hospitals from European and Asiatic Estates.

M O N T H S			GOVERNMENT HOSPITALS				GROUP HOSPITALS				TOTAL	
			European Estates		Asiatic Estates		European Estates		Asiatic Estates			
			Admis- sions	Deaths	Admis- sions	Deaths	Admis- sions	Deaths	Admis- sions	Deaths	Admis- sions	Deaths
January	...	...	...	...	...	...	42	...	...	...	42	...
February	...	...	...	...	...	...	10	...	1	...	11	...
March	...	...	...	...	...	...	8	...	...	...	8	...
April	...	...	...	...	...	...	13	...	...	...	13	...
May	...	...	...	...	...	...	5	...	...	...	5	...
June	...	...	...	...	...	...	4	...	...	...	4	...
July	...	...	1	...	...	...	...	...	...	...	1	...
August	...	...	...	...	...	...	...	...	...	...	...	...
September	...	...	...	...	...	...	...	...	...	...	...	...
October	...	...	...	...	...	...	1	1	...	...	1	1
November	...	...	...	...	...	...	2	...	...	...	2	...
December	...	...	...	...	...	...	5	...	...	...	5	...
Total	...		1	...	...	...	90	1	1	...	92	1

TABLE XXI.

Hospital Admissions from Estates.

ESTATES		GOVERNMENT		GROUP		TOTAL	
		Admissions	Deaths	Admissions	Deaths	Admissions	Deaths
European	...	1,095	59	29,773	640	30,868	699
Asiatic	...	72	3	635	19	707	22
Total	...	1,167	62	30,408	659	31,575	721

TABLE XXII—A.

Birth Rates and Infantile Mortality Rates on European Estates.

Nationalities			Population	Births	Birth rate	Infantile deaths	Infantile mortality rate
Malays	...	...	4,914	95	19.33	14	147.37
Indians	...	...	39,181	1,510	38.54	331	219.21
Chinese	...	...	1,607	31	19.29	3	96.77
Javanese	...	...	35	2	57.14	...	...
Others	...	...	127	...	...	...	...
Total	...	...	45,864	1,638	35.71	348	212.45

TABLE XXII—B.

Birth Rates and Infantile Mortality Rates on Asiatic Estates.

Nationalities			Population	Births	Birth Rate	Infantile Deaths	Infantile Mortality Rate
Malays	...	...	7,365	27	3.67	2	74.07
Indians	...	...	2,184	30	13.74	4	133.33
Chinese	...	...	3,650	16	4.38	...	...
Javanese	...	...	37	1	27.03	...	...
Others	...	...	92	...	...	...	...
Total			13,328	74	5.55	6	81.08

Malaria Notification from Estates for the year 1931—1938.

Year			Hospitals	Lines	Total
1931	...	...	3,229	9,600	12,829
1932	...	...	2,917	7,891	10,808
1933	...	...	4,894	9,484	14,378
1934	...	...	4,846	9,199	14,045
1935	...	...	8,629	9,571	18,200
1936	...	...	5,701	4,676	10,377
1937	...	...	7,726	5,438	13,164
1938	...	...	14,357	7,497	21,854

APPENDIX A.

KAMPONG IMPROVEMENT WORK.

As 1938 was the first year in which any measures were taken to improve the general health of the Kampong population it was considered desirable to put up a separate report of the result of the year's work. The need for improvement in the condition of the Kampong population was shown clearly in the Health Survey carried out by Drs. Vickers and Strahan in 1936. Whilst many of the findings of that report stressed the uniformly low standard of nutrition, no attempt appears to have been made to make good that deficiency.

The work was started in March 1938, and was first limited to South Kedah owing to shortage in staff. Later by a readjustment of the duties of the Assistant Health Officer South Kedah and the Health Officer Central Kedah the work was extended to the Kuala Muda and Baling Districts. The results achieved have been remarkable, and reflect great credit on the energy and tact of the Health staff and also on the co-operation of the District Officers concerned. At first it was found necessary for the District Officers to call the penghulus together and exhort them to get on with the work and this was particularly noticeable in the Kuala Muda district where the primary inertia of the people was more marked.

Progress must necessarily be slow and halting. All rural population are suspicious of changes. Few people like to be improved, and whilst it is relatively easy to sway the opinion of the literate population by feeding them daily doses of propaganda in their newspapers, it is a very difficult proposition where neither literacy nor a newspaper is the rule.

At the beginning of the work, an attempt was made at a Health Survey as well as Kampong Sanitation, and this nearly resulted in disaster. Luckily we realised in time that we would rapidly lose their confidence and their co-operation if we persisted in carrying out haemoglobin and parasite surveys, and we promptly restricted our efforts to improving sanitation.

We discovered early in the work, that models and diagrams were of very doubtful use. The tendency to take them too literally resulted in complaint of difficulty and excessive expense. It was then decided to discontinue the use of such models and diagrams and depend on explanations relying more on their own ideas for our results. That we were justified in this attitude soon proved itself.

The first step in the scheme was the provision of latrines and we frequently met with the statement that their forefathers for generations had no latrines and yet thrived, (Tok nenek kita tak pernah buat jamban itu pon depa hidop), a statement, strangely enough, frequently made by more educated persons, but no less fallacious.

Much persuasion and argument was needed to overcome this view, and finally they were prepared to accept the idea that possibly their forefathers were sometimes wrong.

Occasionally we met with active opposition and one particular "Pegawai Misjid" after hearing out lectures, went back to the people and advised them not to do as we had told them. Eventually he withdrew his opposition.

In the first few months excuses for not building latrines were common and they were either too busy looking after their rice or their buffaloes or they weren't well. When these were overcome, there were difficulties of digging the necessary pits owing to the present of water or stones. Finally they consented to begin work.

Work actually began in Keladi in the Mukim of Kulim on 21st March, 1938, and from there work was extended to every Mukim in South Kedah. In July the work was extended to Central Kedah and Baling Areas. The population affected was in the neighbourhood of 25,000 and the houses numbered 6,000. The names of the Kampongs or Mukims are given and Maps of each area are attached shewing their positions.

A similar scheme was started late in the year in Langkawi. There was an immediate response and latrines in large numbers were built. Unfortunately most of them were unsatisfactory owing to lack of supervision in their construction, and it will be necessary for them to be rebuilt.

The services of a Health Inspector in Langkawi are now essential, and it will be necessary to place one there if results are to be obtained from this Kampong work.

For each Mukim or Kampong a certain number of Committee Members were elected to assist the Penghulu in supervising houses in the neighbourhood of their own. Some 10—15 houses were allotted to each member so the time needed to look after them would not prevent him carrying on with his own work. The enterprising Penghulu of Sungei Seluang needs special mention as he undertook all the work with only the aid of his Panglimas. His Mukim is one of the most advanced both in general cleanliness and in the provision of latrines, and in addition in the amount of vegetable cultivation in spite of a late start (6-5-57=4-7-38).

Lectures in Malay were given by the Assistant Health Officer and the Health Inspectors, and the subjects dealt with were:—

1. Refuse disposal.
2. Nightsoil disposal.
3. Water supplies.
4. Food: the value of vegetables, milk, eggs and undermilled rice, and the importance of growing vegetables and rearing poultry were stressed.
5. Prevention of Malaria, Hookworm and beri-beri and the care of lepers.

Posters of instructions on refuse and nightsoil disposals were issued to penghulus, panglimas and committee members.

Frequent misconceptions had to be explained away, such as that eating eggs produced worms, and that quinine was made from Human blood (a reason often given for not taking it). An attempt was made to persuade them that a diet of rice, salt fish and pepper was inadequate for a nursing mother and not in the best interests of the infant, and that a more generous and nutritious diet was desirable.

HOUSING AND SANITATION.

The typical Kampong is a raised detached building connected by a short passage way to a raised kitchen. In the poorer type the Kitchen forms part of the main building. The roofs are mostly attaps, and the walls on about half are made of wood. A few have corrugated iron roofs and these usually have no ceilings. The number of windows in these houses is a good guide to the financial position of the owners.

Usually they are completed devoid of any arrangements for dealing with sullage from the kitchen, and where animals are kept they are stabled under the house. Quite a number of buildings are deficient in height and this usually results in bad lighting and ventilation.

The chief occupations of the people are rubber tapping and padi planting. Considerable hardship occurs when there is any cessation of tapping on the native estates.

Refuse disposal was non-existent. Refuse, dung and filth of all kinds were scattered about the house and as a result flies and rats were numerous.

Since the introduction of Kampong Improvement Work conditions have improved enormously. Animals have been removed from below the houses, and the places have been cleaned as is shewn by the attached photographs. The women and children take an active part in cleaning the compound daily and minor injuries due to nails and broken glass are now rare.

When the campaign started proper nightsoil disposal did not exist. Any secluded spot served the purpose, and it must be understood that defaecation in a crowded Kampong is a nightly habit. The child population, being less embarrassed by modesty relieved themselves around or under the house, the adult population going farther afield.

If a latrine was seen it probably belonged to a Chinese. Since then some 730 latrines have been constructed in the South Kedah area. 37 in Kuala Muda District and 23 in Baling District.

A considerable number are under construction, but these are never considered as frequently a start is made and nothing further is done for many weeks. This is not as many as are needed as some of the Kampongs have been very slow in carrying out the work and this has been due entirely to the Penghulus.

There is very much variety and originality in the design of these latrines and the attached photographs give some idea of it.

The owning of a latrine has now achieved a distinct social value. It is a matter of pride that a visitor to a Kampong need not now take a chance in the bush, but can relieve himself without fear of disturbance.

Owners of latrines have become more sensitive to being disturbed in these natural functions and prefer the privacy of the latrines to the open bush, and in fact now find some difficulty in carrying out these natural functions in the open.



I



II



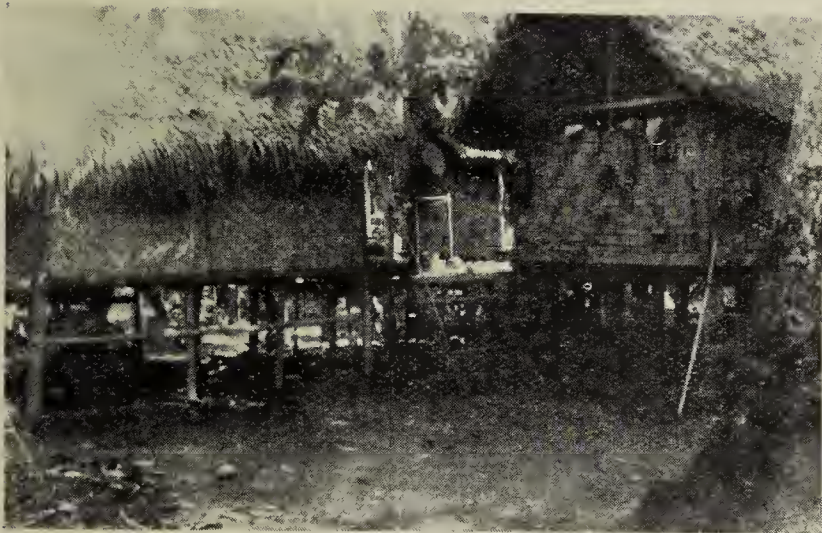
III



IV

I, II, III, IV, Houses with improved sanitation.

IV Note the goat-house which was under the main building removed as shown in back-ground.



(Above) Poor sanitation but 100% improved.



(Above) House with poor sanitation.



Mound Latrine.



Mound Latrine with concrete base.



Pit Latrine with concrete squatting platform.



Pit Latrine with plank squatting platform.



I

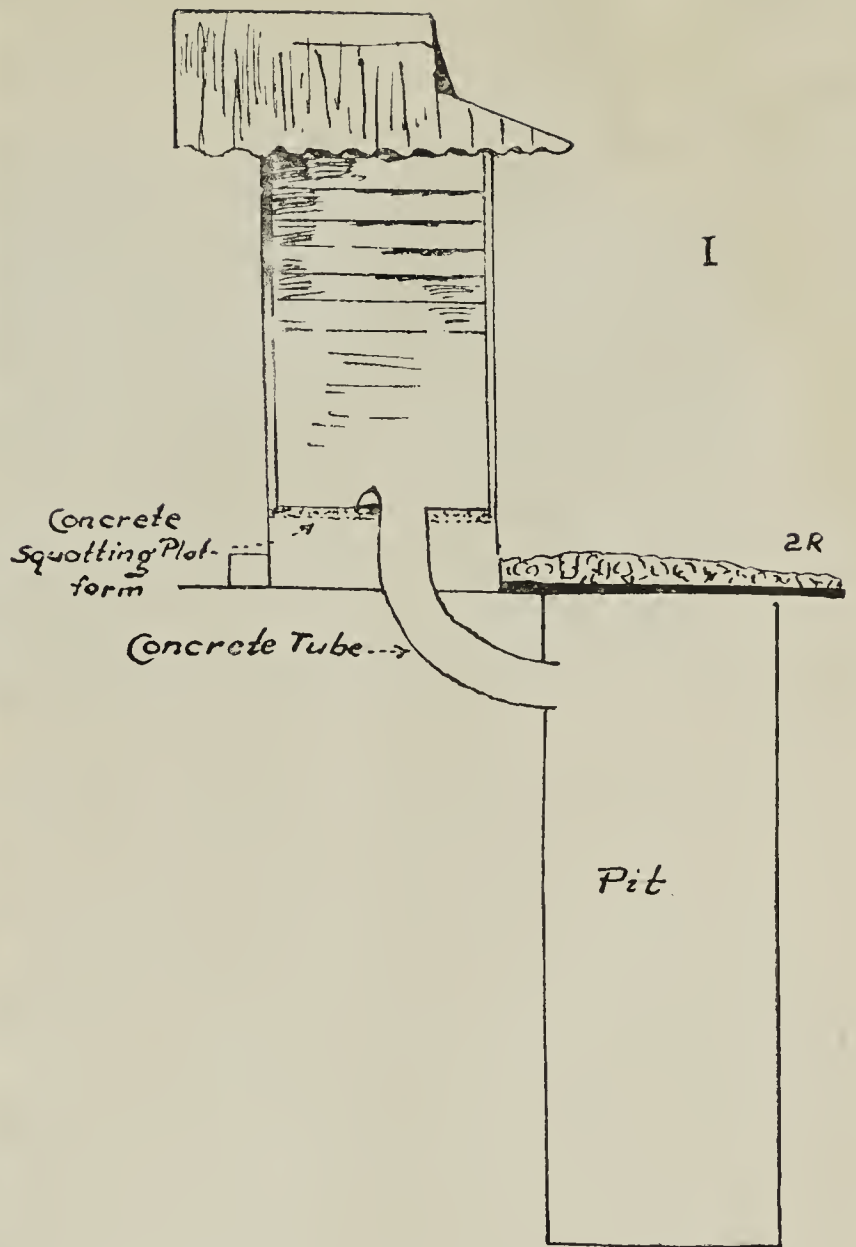


Diagram showing the construction of Latrine I.



II. Concrete Squatting Platform to No. I.



IV. Similar type of Latrine, having the flushing tube above ground (X) the position of the pit.



Pit-Latrine within the enclosure of the house (This is an illustration to dispel of the idea that foul odour arises from Latrine).



III. Original-Latrine of the same construction but of a cheaper type compared to No. 1. Note the handkerchief—the position of the pit.



Vegetable gardens, showing fencing to prevent goats, etc.



Vegetable garden (another view).



Experimental vegetable gardens done by Penghulu Osman bin Nayan of Bagan Samak, Bandar Bahru.

WATER SUPPLY.

Sources of drinking water are shallow unprotected wells and springs. Advice was given on protection of these supplies and the removal of the chief causes of pollution. It was emphasised that drinking water should be boiled. Owing to the flat taste of boiled water, and the additional labour involved, the advice was seldom taken.

FOOD SUPPLY.

Whilst emphasising the need for improving their food supply the question of poultry keeping naturally was considered, as eggs would form a most welcome addition to the protein content of their daily food. Poultry is seldom reared under good conditions, and the birds are usually left to forage for themselves. Whilst such haphazard methods are adopted there is little likelihood of any great increase in the numbers they keep. It has been suggested to those who grow more vegetables than their requirements, that they should make some attempt to grow food for poultry.

About one-third of the families in 6 Kampongs investigated own cattle or buffaloes which are used for ploughing. The cattle are usually kept under the main building and no attempt was made even to remove the dung. One need not emphasise the undesirability of such a practice. It was pointed out to them the need for keeping the cattle separate and the value of the dung for the vegetable garden. This has met with some response, and it is customary to find that the vegetable gardens springing up everywhere are being manured in this way. The development of vegetable gardens is a feature now of the Kampongs, and since the campaign started the price of vegetables in the Kampongs has been considerably reduced as many of the people now supply their own requirements. At first the people were emphatic that the land was unsuitable, but the presence of Chinese vegetable gardens disproved this as did the resulting yield when they were eventually persuaded to plant.

A fair number of goats are to be found in the Kampongs. They are usually left to forage for themselves. On the whole they appear to be healthy. A striking feature however, is the very small quantity of milk they yield. This probably accounted for the fact that the goat as a source of milk supply has never been considered. An improvement in the breed should receive early attention with a view to increasing the milk supply as then can be no question that goats could become a very valuable source of milk for the Kampong population.

Particulars from six Kampongs population, houses, buffaloes, cattle, goats, fowls, ducks and padi land were collected to see to what extent they could be self supporting in food. Generally there is an insufficient supply of food with the possible exception of fish which appears to be plentiful in the neighbouring streams. Milk and meat are beyond the reach of the majority, and as only one-third of the families have their own cattle or buffaloes, milk does not form a regular part of their diet.

Coconut oil is their chief source of fat, and seldom do any of them get butter or ghee.

Rice forms the bulk of their diet, and luckily this is undermilled. It is supplemented by a certain amount of fruit, bananas, durian (in season), pineapple and papaya and in addition they have a certain amount of sweet potato, chilly and sugar cane.

Very few vegetables were eaten as only a very few took the trouble to cultivate them, but depended on the shops for their supply when they could afford to buy.

Except for rice, their food is insufficient for their needs, and when rubber tapping ceases and they have not money to purchase additional foods, there is considerable hardship. Many houses are left as their occupants go elsewhere to find work.

The care of the infant leaves much to be desired while the chief source of food supply is breast milk, this is deficient in quality owing to the habit of reducing the mother's diet—a custom which the Malays would do well to discard. In addition there is tendency to feed very young infants with rice and cooked bananas, with the result that intestinal disturbances are common.

GENERAL.

Whilst bathing is frequent soap is seldom used, and accumulations of dirt behind the ears, on the neck and in the crevices of the body are common. The habit of bathing within a sarong is not conducive to real cleanliness. Scabies, ring-worm and other skin diseases are common.

The need for early replacement of the 'bidans' by trained midwives is urgent. Far too many mothers die in child birth and a still greater number are left permanent invalids as a result of the dangerous attentions of these 'bidans'.

A certain amount of treatment was given in one kampong when the children were given a cursory examination. In the same kampong the adults were treated for Hook-worm and one patient was heard to remark "the number of worms I passed made me shiver, and I feel much lighter".

1. There can be no question but that there is a definite lack of essential foods in the diet of the Kampong population of South Kedah.

2. Co-Operation is lacking among the raayats.

3. The people live for today and make no provision for the future.

4. The idea of thrift is unknown to them, and what property they have owned has passed to others.

In conclusion, I should like to mention that nothing whatever could have been achieved without the assistance of the District Officers of the Districts concerned, who gave their assistance willingly, and were instrumental in stimulating the Penghulus to action. The Health Staff worked well and frequently spent long hours in the Kampongs returning late in the afternoon for what should have been their midday meal.

The Assistant Health Officer, South Kedah, was responsible for the whole of the campaign in Kedah. To give him sufficient time for this work, it was found necessary to make some rearrangement of his duties, and the Health Officer, Central Kedah, was called upon to take over the care of the European Estates.

The Assistant Medical Officer, Langkawi was responsible for the work on Langkawi Island.

LIST OF KAMPONGS OR MUKIMS VISITED IN SOUTH KEDAH.

No.	Name of Kampongs.	Date of Commencement.
1.	Kampong Keladi and Pondok Labu	21—3—38
2.	Kampong Sedim	5—4—38
3.	Kampong Karangan, Sungei Kob, and Jangkang ..	6—4—38
4.	Kampong Ulu Mahang, Lobak, Bangol Kabu and Paya ..	12—4—38
5.	Kampong Relau and Kampong Tengah	16—4—38
6.	Mukim Bagan Samak	19—4—38
7.	Kampong Bukit Buloh, Sungei Itam, Terap and Sungei Tengah	24—4—38
8.	Kampong Serdang, Sungei Punti, Leret and Sungei Setul ..	27—4—38
9.	Kampong Sungei Batu, Sungei Taka and Jerumal ..	30—4—38
10.	Kampong Sungei Kechil Ilir	25—6—38
11.	Kampong Guar Lobak, Dekah, Ikor Kuching, Bongol Besi, Tanjong Belit and Terat Batu	29—6—38
12.	Kampong Terap and Sungei Tengah	3—7—38
13.	Mukim Sungei Seluang and Padang China	4—7—38
14.	Kampong Junjong and Ayer Puteh	28—11—38
15.	Kampong Lunas and Sungei Limau	29—11—38
16.	Kampong Padang Meiha	31—11—38

LIST OF KAMPONGS OR MUKIMS VISITED IN KUALA MUDA DISTRICT.

No.	Name of Kampongs					Date of Commencement.
1.	Rantau Panjang	..	..	..	..	31—7—38
2.	Sintok Bugis	..	..	..	..	7—8—38
3.	Merbok	..	..	..	..	13—8—38
4.	Permatang Haji Kudong	..	..	..	..	29—9—38
5.	Batu Lintang	..	..	..	..	3—10—38
6.	Permatang Samak	..	..	..	..	8—10—38
7.	Gurun	..	..	..	..	19—10—38
8.	Tikam Batu	..	..	..	..	31—10—38
9.	Jalan Sungei Layar	..	..	..	..	1—11—38
10.	Bujang	..	..	..	..	3—11—38
11.	Pokok Tai	..	..	..	..	6—11—38
12.	Padang Temusu	..	..	..	..	1—12—38
13.	Batu Belachan	..	..	..	..	13—11—38
14.	Sungei Emas	..	..	..	..	3—12—38
15.	Permatang Jambu	..	..	..	..	3—12—38
16.	Pinang Tunggal	..	..	..	..	6—12—38
17.	Pokok Asam	..	..	..	..	7—12—38
18.	Simpur	..	..	..	..	27—12—38
19.	Puala Sepam	..	..	..	..	31—11—38
20.	Berapit	..	..	..	..	19—11—38
21.	Merbau	..	..	..	..	30—11—38
22.	Sungei Gelam	..	..	..	..	5—12—38
23.	Sungei Pasir	..	..	..	..	7—12—38
24.	Bakar Arang	..	..	..	..	8—12—38
25.	Permatang Durian	..	..	..	..	30—11—38
26.	Permatang Tok Gedong	..	..	..	..	7—12—38
27.	Bukit Kechil	..	..	..	..	7—12—38
28.	Pasir	..	..	..	..	15—11—38
29.	Sungei Piah	..	..	..	..	21—12—38

LIST OF KAMPONGS OR MUKIMS VISITED IN BALING DISTRICT.

No.	Name of Kampongs					Date of Commencement.
1.	Tok Sabang	..	..	..	..	27—9—38
2.	Rambong	..	..	..	..	11—10—38
3.	Sira	..	..	..	..	18—10—38
4.	Terabak	..	..	..	..	25—10—38
5.	Weng	..	..	..	..	1—11—38
6.	Tanjong Perai	..	..	..	..	8—11—38
7.	Lalang	..	..	..	..	15—11—38
8.	Hangus	..	..	..	..	29—11—38
9.	Sadek	..	..	..	..	6—12—38
10.	Katembah	..	..	..	..	13—12—38
11.	Rambong	..	..	..	..	15—12—38
12.	Mengkuang	..	..	..	..	20—12—38

APPENDIX B.

EXPERIMENT ON CONTROL OF RICE FIELD MALARIA BY ALTERNATE FLOODING AND DRAINING.

Alor Star is a town with extensive areas of rice fields all around it and the malarial problem of the town is identical with that of the rice field areas which comprise the Coastal and North West Districts of the State. From studies on "Alor Star Malaria" made in the past, the rice cultivating season *i.e.* September—January, was found to be the period of highest malaria incidence in the town and that *A. barbirostris* is the common carrier which breeds universally in rice fields in the season. Various Anti-Larval Measures were experimented with and found either ineffective or prohibitive in cost.

2. A suggestion was made early this year to control anopheline breeding by the alternate flooding and draining of the rice fields. Its aim was to reduce such breeding to the barest possible minimum without interfering with the process of cultivation and yield. With this idea in view the Principal Agricultural Officer was approached just before the paddy season started to select a suitable patch of rice field where water could be run on and off as required and to afford the necessary help throughout the experiment. He kindly agreed and selected a small patch about a relog in area at the "paddy test station" Jitra. It was divided into two equal plots—one to be used as a Control and the other for the Experiment.

3. The procedure followed was to keep the experimental plot full, for 5 days in the week, and dry for the remaining 2 days, and to do check larval surveys weekly in both, two days after refilling.

The experiment was started as soon as the seedlings were planted (5-9-1938).

The attached Table shows the comparative larval findings with species caught, the number of dips being equal.

It may be seen, firstly, that the procedure when carried out satisfactorily effected 80 to 90% reduction in all breeding. It was a result which exceeded expectations.

5. Secondly it was interesting to find that the established carrier, *A. barbirostris* was never found breeding in the plot, assuming that the solitary larva recovered on 19-11-38 had drifted into the field on account of the general flood preceding that survey. Whether the absence of *A. barbirostris* was due to an alteration of the value of the water caused by its periodic renewal or to the slight disturbance from the same cause, is undecided and needs further investigation.

6. Thirdly it was noticed that the plot was drained and dry as soon as the rice grains began to be ripe and heavy—a time when water was a disadvantage to the plants. On the other hand the Control plot had several small pools of water with overhanging paddy plants giving a shade condition eminently suitable for *A. barbirostris* breeding. The last two surveys in the attached table substantiate the statement.

7. The Experiment was terminated when both plots were dry (31-12-38).

R. D. GROSS,
Ag. Senior Health Officer, Kedah.

LARVAL SURVEY RESULTS AT PADDY TEST STATION, JITRA.

DATE.	CONTROL PLOT						EXPERIMENTAL PLOT						Approximate reduction in exp. plot. %	REMARKS.	
	A. Barbiros	A. H. Nigerr	A. H. Sinens	A. Vagus	A. Philippi	A. Kochi	TOTAL	A. Barbiros	A. H. Nigerr	A. H. Sinens	A. Vagus	A. Philippi			A. Kochi	TOTAL
10—9—38	...	3	...	15	2	...	20	...	2	2	13	2	...	19	Water let in from Control Plot.
17—9—38	...	2	...	5	...	...	7	...	...	...	...	1	...	1	—
24—9—38	...	13	2	...	1	...	16	...	1	...	2	...	...	3	—
1—10—38	...	14	5	...	...	...	19	...	...	1	...	...	...	1	—
8—10—38	1	12	4	...	...	...	17	...	1	1	...	...	...	2	—
15—10—38	13	16	11	...	...	1	41	...	2	1	...	...	...	3	—
22—10—38	7	12	4	...	...	...	23	...	4	1	...	...	...	5	Water slightly overflowing from Control Plot.
29—10—38	4	9	3	...	...	...	16	...	1	1	...	...	...	2	—
5—11—38	...	3	4	...	...	...	7	...	...	1	...	...	...	1	Heavy Rains.
12—11—38	2	2	4	...	...	...	8	...	2	3	...	...	...	5	Water overflowing from Control Plot.
19—11—38	...	2	...	...	...	...	2	1	5	...	...	...	...	6	General Flood.
3—12—38	...	6	5	...	...	...	11	...	1	...	...	...	1	2	—
10—12—38	6	13	8	...	...	...	27	...	1	1	...	...	...	2	Experimental Plot Drying.
17—12—38	14	...	...	...	...	...	14	...	...	...	...	...	...	...	Experimental Plot Dry Breeding in small pool in Control Plot.
24—12—38	10	...	3	...	...	...	13	...	...	...	...	...	...	...	“
TOTAL ...	57	107	53	20	3	1	241	1	20	12	15	3	1	52	

PART IV.

PATHOLOGICAL DEPARTMENT

BY

DR. M. B. OSMAN, M.D., B.S. (HONGKONG).

STAFF.

Pathologist	..	..	..	Dr. Mustapa bin Osman.
Asst. Pathologist	..	..	..	Dr. V. G. Patwardhan.
Lab. Assistant	..	..	..	Abdul Rahman bin Muneer.
Lab. Attendants	..	..	..	Johari bin Jamil.
				Ali bin Abdul Kadir.
Clerk	..	..	..	Bashah bin Hashim.

LEAVE.

Dr. Patwardhan returned from long leave on 7-6-38.

TRAINING.

The following came to this Laboratory for training:

Lab. Asst., Loh Ah Soo from 13-5-37 to 7-6-38;

Lab. Asst., Murugeson from 18-8-38 to 16-9-38.

Raja Gopal of the Sungei Patani Group Hospital came for a few weeks to learn some of the more simple laboratory procedures.

WASSERMANN AND KAHN REACTIONS.

4,192 samples were received and gave the following results:—

W.R. 867 positive 2,795 negative 301 doubtful and 130 Anticomp.

K.R. 940 positive 2,983 negative 170 doubtful.

99 of these reached the laboratory in a decomposed condition and unsuitable for examination.

BLOOD CULTURE FOR BACT. TYPHOSUM.

The number of samples received was 40 and in only 3 cases were the organisms isolated.

URINE FOR ORGANISMS.

203 samples for Bact. typhosum resulted in the isolation of the organisms 14 times; N. gonorrhoea was recovered 17 times from 23 samples and Bact. coli 10 times from 22; 2 samples for M. tuberculosis gave negative results.

STOOL.

Bact. typhosum was isolated in 35 out of 316 samples and Bact. dysenteriae 15 times out of 31. 2 samples for M. tuberculosis were both negative.

THROAT SWABS.

112 were received and of these 18 gave positive results for *C. diphtheriae*.

WATER SAMPLES.

In all 138 samples were received:

92 were Government Samples,

22 samples from Perlis and

24 samples from the Estates.

POLICE EXHIBITS.

83 exhibits were examined with 42 positive and 41 negative for human blood.

A single sample for animal blood gave positive result.

In none of 14 exhibits could spermatozoa be noted.

A piece of bone, suspected to be human was found to be goat's; and a single sample of hair was identified as human.

The amount of revenue collected was \$356.50 as against \$354.00 received last year.

Enclosure I gives in summary form the total number of examinations carried out in 1938.

Enclosure II represent the work done for Estate Hospitals and enclosure III, that done for Perlis Government.

BLOOD AND SERUM.

Wassermann Reaction	..	..	..	..	..	..	4,192
Kahn Reaction	..	..	..	..	..	..	4,192
Widal Reaction	..	..	..	..	..	..	371
Weil-Felix Reaction	..	..	..	..	..	..	120
Estimation of Sugar	..	..	..	..	..	..	49
„ Urea	..	..	..	..	..	..	42
„ Cholestrol	..	..	..	..	..	..	1
„ Blood Iron	..	..	..	..	..	..	16
„ Haemoglobin	..	..	..	..	..	..	170
„ Icterus Index	..	..	..	..	..	..	2
Van den Berg Reaction	..	..	..	..	..	..	17
Red Cell Count	..	..	..	..	..	..	170
Leucocyte total Count	..	..	..	..	..	..	38
Differential Leucocyte Count	..	..	..	..	..	..	11
Reticulocyte Count	..	..	..	..	..	..	2
Estimation of Blood Volume	..	..	..	..	..	..	14
Sedimentation test	..	..	..	..	..	..	13
Blood Matching	..	..	..	..	..	..	2
Blood Grouping	..	..	..	..	..	..	3
Detection of Malarial parasites	..	..	..	..	..	..	6
„ Spirochaetes	..	..	..	..	..	..	1

URINE.

Estimation of Sugar	..	..	..	..	..	..	5
„ Urea	..	..	..	..	..	..	3
Diastase Test	..	..	..	..	..	..	1
Weil-Felix Reaction	..	..	..	..	..	..	12
Detection of Albumin, Sugar etc.	..	..	..	..	..	..	57
„ parasites	..	..	..	..	..	..	1
„ Leptospira	..	..	..	..	..	..	1

Carried forward .. 9,522

STOOL.

				<i>Brought forward</i>	..	9,522
Estimation of Fat	..	..	..	..	..	2
Simple Analysis	..	..	..	..	..	24
Detection of Amoebae	..	..	..	..	..	28
„ Ova and parasites	..	..	..	..	..	87
„ Occult blood	..	..	..	..	..	7

C. S. FLUID.

Wassermann Reaction	..	..	..	..	..	1
Kahn Reaction	..	..	..	..	..	1
Cell Counts	..	..	..	..	..	4

GASTRIC CONTENTS.

Estimation for Acidity etc.	..	..	..	..	..	159
Detection of blood	..	..	..	..	..	2
„ Malignant cells	..	..	..	..	..	1

VOMIT.

Detection of malignant cells	..	..	..	..	..	1
Preparation and examination of histological Sections	..	..	..	..	..	43

BACTERIOLOGY.

Blood culture for Bact. typhosum	..	..	..	..	..	40
Urine for Bact. typhosum	..	..	..	..	..	217
„ N. Gonorrhoea	..	..	..	..	..	40
„ Bact. Coli	..	..	..	..	..	32
„ M. tuberculosis	..	..	..	..	..	2
Stool for Bact. typhosum	..	..	..	..	..	351
„ Bact. dysenteriae	..	..	..	..	..	46
„ M. Tuberculosis	..	..	..	..	..	2
Sputum for M. Tuberculosis	..	..	..	..	..	1
C. S. Fluid for M. Tuberculosis	..	..	..	..	..	3
„ N. Meningitidis	..	..	..	..	..	2
„ H. Influenzae	..	..	..	..	..	2
Pleural Fluid for M. Tuberculosis	..	..	..	..	..	2
Pus	..	..	..	..	..	17
Cervical Swabs	..	..	..	..	..	2
Vaginal Swabs	..	..	..	..	..	2
Eye Swabs for N. Gonorrhoea	..	..	..	..	..	2
Ear Swabs for C. diphtheriae	..	..	..	..	..	1
Nasopharyngeal swabs for C. diphtheriae	..	..	..	..	..	6
„ „ other organisms	..	..	..	..	..	11
Throat Swabs for C. diphtheriae	..	..	..	..	..	112
„ „ other organisms	..	..	..	..	..	8
Urethral Swabs for N. Gonorrhoea	..	..	..	..	..	9
Meat for food poisoning organisms	..	..	..	..	..	1
Cream for food poisoning organisms	..	..	..	..	..	1
Fruit for food poisoning organisms	..	..	..	..	..	1
Preparation of Autovaccines	..	..	..	..	..	15
Animal experiments	..	..	..	..	..	6
Bacteriological Exam: of Water Samples	..	..	..	..	..	138
Smear for the detection of M. leprae	..	..	..	..	..	3
„ „ H. ducreyii	..	..	..	..	..	8
„ „ Spirochaetes	..	..	..	..	..	10
„ „ Fungi	..	..	..	..	..	1

Carried forward .. 10,976

Brought forward .. 10,976

POLICE EXHIBITS.

Examination for the presence of Human blood	..	..	..	83
„ „ Animal blood	..	..	..	2
„ „ Spermatozoa	..	..	..	14
„ „ Hair	..	..	..	1
Diagnosis of Species of Bone.	..	..	..	1
TOTAL				11,077

ESTATE HOSPITALS.

BLOOD AND SERUM.

Wassermann Reactions	..	..	..	..	..	875
Kahn Reactions	..	..	..	..	..	875
Widal Reactions	..	..	..	..	..	64
Weil-Felix Reactions	..	..	..	..	..	6
Estimation Blood Iron	..	..	..	..	..	1
„ of Blood Volume	..	..	..	..	..	1

BACTERIOLOGY.

Blood Culture for Bact. typhosum	..	..	..	..	2
Urine Culture for Bact. tyhosum	..	..	..	..	5
„ „ Bact. Coli	..	..	..	..	2
Stool Culture for Bact. typhosum	..	..	..	..	8
„ „ Bact. dysenteriae	..	..	..	..	5
„ „ M. Tuberculosis	..	..	..	..	2
Throat Swabs for C. diphtheriae	..	..	..	..	3
„ „ other organisms	..	..	..	..	1
Bacteriological Exam: of Water Samples.	..	..	..	..	24
				TOTAL	1,874

PERLIS GOVERNMENT HOSPITAL.

BLOOD AND SERUM.

Wassermann Reactions	..	..	..	..	..	103
Kahn Reactions	..	..	..	..	..	103
Widal Reactions	..	..	..	..	..	13
Weil-Felix Reactions	..	..	..	..	..	12
Estimation of Sugar	..	..	..	..	..	1
Van den Berg Reactions	..	..	..	..	..	1

BACTERIOLOGY.

Blood Culture for Bact. typhosum	..	..	..	..	1
Urine Culture for Bact. typhosum	..	..	..	..	2
Stool Culture for Bact. typhosum	..	..	..	..	2
Pus	..	..	..	..	7
Throat Swabs for C. diphtheriae	..	..	..	..	11
Nasopharyngeal swabs for organisms	..	..	..	..	4
Bact. Examinations of Water Samples	..	..	..	..	22
Preparation and examination of Histological Sections	..	..	..	..	2
				TOTAL	284

OUTSTATIONS—Injections and Consultations.
YEN.

			Injection	N. A. B.	Consultations			
January	4	2			
February	9	3			
March	9	2			
April	14	8	Injections		
May	10	4	1st	—	73
June	13	10	2nd	—	27
July	13	5	3rd	—	8
August	19	3	4th	—	3
September	11	6	5th	—	3
October	13	3	6th	—	1
November			
December			
Total			...	115	45	Total seen 160		

Malays 97, Chinese 6,
Tamil 2.

Malays 44,
Chinese 1

Average per month 11·5 Average per month 4·5 Total Average per month 16·

Injections Consultations						No. of Injections					
						Total (4 months)					
						1st	2nd	3rd	4th	5th	6th
Jitra	...	80	4	=	84	59	12	6	3	...	...
Husbah	...	32	...	=	32	10	11	9	1	1	...
K. Nerang	...	53	13	=	66	26	12	8	6	1	...
Changloon	...	18	20	=	38	10	3	4	1	...	...
Total	...	183	37	=	220	105	38	27	11	2	...

Average per month = 45·75 9·25 55

Attendances at the four outstations above was discontinued from August. Actually the numbers account for 5 months only.

VISITS TO HOMES.

Month.						Firt.	Revisits.
January	..	..	..	..	..	35	70
February	..	..	..	..	..	24	55
March	..	..	..	..	..	25	60
April	..	..	..	..	..	30	70
May	..	..	..	..	..	32	82
June	..	..	..	..	..	28	65
July	..	..	..	..	..	42	104
August	..	..	..	..	..	48	98
September	..	..	..	..	..	50	115
October	..	..	..	..	..	52	120
November	..	..	..	..	..	22	80
December	..	..	..	..	..	40	100
TOTAL						438	1,009

Total 1,447.
Average per month 120·5.

PART V.

MEDICAL AND SANITARY REPORT, PERLIS.

FOR THE YEAR 1938 A. D.

(28th Shawal, 1356 A.H., to 9th Zulkaedah, 1357 A.H.).

I. ADMINISTRATION.

(a) STAFF.

The principal appointments are:—

The State Surgeon, Kedah, who visits the State at least once a month.
 An Assistant Medical Officer,
 An Assistant Health Officer,
 A Hospital Assistant Grade I,
 One Dresser Grade II,
 Two Dressers Grade III,
 A Vaccinator,
 A Mosquito-Larvae Collector and Identifier,
 A Midwife.

(b) CHANGES IN STAFF.

Enche Mohd. Darus, Mosquito-Larvae Collector and Identifier, was transferred to the post of Medical clerk on account of ill-health and Enche Ya'acob was appointed as probationary Mosquito-Larvae Collector and Identifier.

The Assistant Health Officer was appointed Registrar of Births and Deaths from July 1st., 1938, prior to which date the office was invested with the Chief of Police.

(c) LEGISLATION.

The following Enactments having a bearing on Medicine and Public Health were passed during the year:—

Enactment No. 5 of 1357—An Enactment to amend and consolidate the law as to procedure in Criminal matters.

Enactment No. 9 of 1357—An Enactment to provide for the control of Rivers and and Streams.

(d) FINANCIAL.

Revenue Collected	..	..	..	..	..	\$ 2,167.32
Expenditure:—						
(a) Personal Emoluments	..	..	..	..	..	\$18,011.31
(b) Other Charges	..	..	..	..	..	\$17,748.81
(c) Special Expenditure	..	..	..	..	..	\$ 1,589.78
(d) Special Services P.W.D.	..	..	..	..	..	\$ 6,955.71
TOTAL						\$44,305.61

The total expenditure represents 5.74% of the total revenue or 6.47% of the total expenditure of the State during 1938.

In addition, a sum of \$1,984.08 was spent for Kaki Bukit from the Kaki Bukit Health Fund.

(e) MEDICAL INSTITUTIONS.

State Hospital, Kangar 100 Beds.

Out-door Dispensary, Kaki Bukit.

Railway Out-door Dispensary, Padang Besar (Administered by the Railway Authorities).

There is an Out-door Dispensary at Kangar Hospital. A Travelling Dispensary pays regular fortnightly visits to Schools, Villages, Cooly Lines and Police Stations accessible by roads and paths.

(f) BUILDINGS.

The following buildings were completed and occupied during the year :

Dresser's Quarters, Kangar Hospital.

Acute Cases Ward, Kangar Hospital.

Dispensary, Simpang Ampat, was completed towards the end of the year; but was opened about the middle of January, 1939.

II. PUBLIC HEALTH.

Two cases of cerebrospinal fever (both Chinese males—mining coolies from Kaki Bukit) were notified during the year, the first on 13-2-38 and the second on 22-10-38 and were treated at Kangar Hospital. The case of posterior basic meningitis—an infant admitted in 1937—died during the year under review.

Three cases of diphtheria were notified during the year of which two fatal cases were admitted into hospital.

61 cases of Chicken-pox and 93 cases of measles (with one death) were seen during the year.

3 cases of typhoid fever (with 2 deaths) and one case of paratyphoid fever (with no death) were admitted into hospital; in the Register of Deaths, 8 deaths outside the hospital have been ascribed to enteric fever.

No cases of tropical typhus were reported.

18 cases of dysentery with 2 deaths were treated at the hospital against 29 cases with 3 deaths in 1937. About half of them (8) were amoebic.

72 cases of lobar pneumonia (with 30 deaths) were treated at the hospital against 44 with 15 deaths in 1937.

4 fatal cases of cerebrospinal meningitis (pneumococcal) were seen during the year.

98 cases of ankylostomiasis (with 2 deaths) were treated at the hospital against 82 with one death in 1937.

58 cases of tuberculosis (47 pulmonary and 11 other types) were admitted into hospital with 6 deaths against 54 with 11 deaths in 1937. 46 deaths from tuberculosis in the State were recorded against 47 in 1937.

Seven cases of tetanus (4 cases of trismus neonatorum—all fatal and 3 cases—ordinary—with one death) were treated at the hospital during 1938.

21 cases of beri beri (13 ordinary and one infantile with no deaths and 7 cardiac with 5 deaths) were admitted into hospital in 1938. The number in 1937 was only one. Of these, 3 were chronic cases (Malay females born in Perlis) and 18 were Chinese, of whom 4 had stayed less than a month in the State whereas the duration of stay of the others in the State varied from 5 months to some years. The increase in the number is mostly due to malnutrition and unemployment.

Of the 16 cases of deaths from violence (all forms including accidents), 7 were due to drowning, 2 to asphyxia from collapse of the roof of the mine and roof of the house, 2 to head injuries as the result of a fall, one to fracture skull result of an attack with an axe in a drunken brawl, one case of infanticide, one snake bite, one hornets' sting and one due to buffalo-gore.

As usual fevers account for the largest portion of the total deaths—480 against 395 in 1937. There was an increase in the number of cases admitted into hospital for malaria—527 against 445 in 1937 while the mortality was less—7 against 10 in 1937.

Infantile convulsions caused frequent deaths—130 against 127 in 1937.

Deaths from respiratory diseases (including pulmonary tuberculosis) are next in order to fevers and were responsible for 202 deaths in the State (173 in 1937).

The total death rate was 20.04—the highest recorded for a number of years. Total deaths amounted to 1,111. The number in 1937 was 965.

The infantile mortality records show 220 deaths against 189 in 1937—111 against 105.41 in 1937.

Total births registered during the year were 1982; the crude birth rate was 35.75. The figures for 1937 were 1,793 and 34.02. 115 still births were recorded as against 105 in 1937. 27 deaths were recorded as due to affections connected with pregnancy and parturition or a percentage of 1.29 to total births. The figure for 1937 was 13 deaths or a percentage of 0.68.

Towards the latter part of November, 1938, Kangar was flooded for two days viz. 18 and 19.

The health of the prisoners in Kangar Gaol was satisfactory. Of the 35 prisoners in the Gaol at the beginning of the year, and of the 128 who were admitted the year, 46 cases were admitted into hospital. (for further details, vide Appendix—C).

The health of the Government Servants was fairly satisfactory; all were examined for signs of pulmonary tuberculosis and one was found to be suffering from active disease.

Larval Surveys by the Health Department showing the prevalent types are summarised in Appendices D and E.

HYGIENE AND SANITATION.

Kangar is the State Capital and Arau is the Raja's Residential seat. Padang Besar, Kaki Bukit, Mata Ayer, Kuala Perlis and Simpang Ampat are the important villages in the State. One Sanitary Board controls all the places mentioned except Kuala Perlis and Simpang Ampat. The buildings only are controlled in both these places at present, but everything is fully set for the introduction of the S. B. Control.

There is much that can be desired in the general sanitary conditions which prevail in the State. No unsurmountable difficulty has been experienced; nevertheless the legislation should be modified to suit present conditions. A new set of bylaws has been prepared and when they are introduced (as proposed during the course of next year), the sanitation in the various towns and villages of the State will undoubtedly improve.

The probationary Sanitary Inspector who was sent to Singapore at Government expense during the year to qualify for the Diploma of the Royal Sanitary Institute returned towards the end of the year after a successful course.

(a) *Antimalarial Measures.* Malaria did not assume epidemic proportions but cases were reported from Kaki Bukit, Tasoh and Bukit Ketri. 538 cases of malaria were treated at the hospital with 7 deaths against 457 cases with 10 deaths in 1937. Chemio-prophylaxis was tried with success on the Tasoh Estate.

Larval surveys were carried out in all the Sanitary Board areas and they were identified as shown in appendices D (page 76) and E (page 77). Mosquito trapping with human bait traps was done in Kangar, but no dangerous species could be trapped. Dissection of mosquitoes could not be undertaken owing to certain changes in the staff.

Routine antimalarial measures such as clearing, oiling, and draining marshy and seepage areas were carried out in the S. B. areas of Kangar, Arau and Kaki Bukit. Two lowlying areas near the Kangar mosque were filled up during the year under review.

The dangerous seepage ravine near the Kaki Bukit Police Station (referred to in last year's report) was successfully subsoiled during the year.

The automatic sluice on the Sungei Bunut worked satisfactorily during the year. Work on the canalisation of the bed of the Sungei Bunut was continued throughout the greater part of the year; but had to be suspended in rainy weather.

Owing to floods, the concrete sides of the channel cracked and collapsed in many places. It is proposed to remedy this defect in the coming year.

Work on subsoiling of the swampy area behind the Sanitary Board Line, Kaki Bukit, was in hand towards the close of the year.

(b) *Sewage Disposal.* Night soil is collected by the single bucket system and trenched in selected sites. Transportation of the night soil to the trenching ground is done by "kandars", but the question of introducing hand carts or lorries for such purposes is being considered. Trenching at Kaki Bukit is done in a new site on the northern side of the Chinese burial ground. This site is very satisfactory.

(c) *Refuse Disposal.* The incinerator at Jejawi has been found to consume all the refuse from Kangar and Arau. The Bee hive incinerator at Kaki Bukit was repaired during the year and is now functioning well. House to house removal of dust-bins together with the removal from public dust-bins has been practised. Although it is advisable to discontinue public dust-bins in shop-house areas yet the time is not opportune for such an action.

(d) *Water Supply.* Work is in hand to improve the water supply of Kangar and Arau. An attempt is made not only to filter and chlorinate the water but also to augment the volume of available water.

(e) *Drainage.* This has been very unsatisfactory in that most of them are earth ones; and a fall adequate enough to effect good drainage in earth drains cannot be obtained on account of the high sub-soil water level in Perlis. Cement drains are being slowly introduced. In Kangar two new road-side drains have been constructed and another one has been re-graded during the year.

(f) *Housing and Town Planning.* In Kangar seven new shop-houses on a vacant land are being constructed with back lanes, and the plans of five other shop-houses have been passed to be erected during the next year. These also have provision for back lanes.

It should be recorded with pleasure that the roads in Kangar have at last been named.

In Arau again, the plans of seven shop-houses have been approved by the S. Board and work will commence during the early part of next year. This is the first step towards the introduction of the new lay-out of the town.

Demolition of old and insanitary houses was carried out during the year; and quite a number of other such houses are under notice to be demolished.

Time is not yet ripe for the realisation of the new village at Kaki Bukit. It has been planned and some shop house lots have even been applied for. In the interests of Public Health and Sanitation the village should be shifted to the new site as soon as possible.

(g) *Controlled Building Areas.* It is very desirable that unsightly hovels and insanitary huts be prevented from springing up at least along metalled roads maintained by the Government. The question has been taken up and the outcome of this deliberation is eagerly awaited.

(h) *Food in Relation to Health and Disease.*

(1) **EATING SHOPS.** The sanitation in all shops has improved a good deal; conditions are still improving; and there is much that can be desired.

(2) **STREET STALL AND HAWKERS.** The trouble in controlling these still persists, but steps are taken to minimise the number gradually.

(3) **RICE MILLS.** A few imported cases of Beri-beri most of which came from Perak gave a great deal of food for thought and anxiety. The number of mills in the State has increased and is yet increasing. It is feared that in the heat of competition the dangers of over milling might be forgotten. All mills are being watched and it is proposed to send samples periodically to the Biochemistry Department of the College of Medicine, Singapore, for purposes of estimation of the Vitamin content of the locally milled rice.

PROPAGANDA.

This work was limited to the issue of posters and notices.

Notices calling attention to the necessity of reporting cases of dog bites, and to the dangers of untreated bites were widely circularised.

Posters dealing with malaria and hookworm infection were obtained from Kedah through the courtesy of the State Surgeon, and were posted at Schools, Mosques and Police Stations.

During the year every person suffering from Yaws was given a printed card which contained a short account of the disease in Jawi and which impressed on the sufferer the necessity for four consecutive weekly injections.

RABIES.

Twenty cases of dog bite were reported, the first on 5-1-38 and the last on 29-12-38. Eighteen dogs were concerned in all; eight were unknown stray dogs, five were declared not rabid after being kept under observation for ten days; one escaped while under observation and could not be traced; one died while under observation on the sixth day after the bite and three were killed on the spot.

The brains of the four dogs as well as that of another dog that bit only cattle and goats were sent to the Institute for Medical Research, Kuala Lumpur; three were reported to be positive for rabies and two negative.

Four who were bitten by unknown stray dogs about six months prior to their reporting themselves at the hospital refused treatment. Eleven cases were given anti-rabic treatment.

Three fatal cases of hydrophobia occurred at the hospital. One, a male Malay, who was bitten by a dog about four months prior to developing symptoms and who did not do anything beyond killing the dog on the spot, came for admission with typical symptoms of hydrophobia and died the next day.

It is tragic and poignant to record that of the eleven cases treated with anti-rabic vaccine, two who were badly bitten about their faces by a rabid dog (its brain was positive for rabies) and who came to hospital a few hours after the bite and who were started on the treatment on the day of admission, (they were being given three weeks' treatment) developed hydrophobia on the 19th and 20th day of the bite and died soon afterwards.

Energetic measures were instituted to combat rabies. Notices calling attention to the necessity of reporting cases of dog bite, were widely circularised throughout the State. A total of 1,837 dogs including 885 bitches were destroyed during the year.

The increase in the number of dog bite cases notified is mainly due to the widest publicity given to the dangers of untreated bite.

OFFICIALS.

The following table gives the Health Statistics of Government Officials (including subordinates) in Perlis:—

	Europeans.			Asiatics.	
Total number of Officials resident	3	384
Average number resident	2	376
Total number on sick list	—	119
Total number of days on sick list	—	1,422
Average daily number on sick list	—	3.90
Percentage of sick to average number resident	—	31.65
Average number of days on sick leave for each patient	—	11.95
Average sick time to each resident	—	3.78
Total number invalids	—	3
Percentage of invalidings to total resident	—	0.78
Total Deaths	—	—
Percentage of deaths to average resident	—	—
Number of cases of sickness contracted away from residence	—	—

ESTATES.

Nationality	LABOURERS		DEPENDANTS			Total
	Males	Females	Adults	Children	Infants	
Malays 	28	17	2	8	4	59
Indians 	133	84	13	101	19	350
Total ...	161	101	15	109	23	409

There were 5 deaths in the Estate Population viz. four labourers (of whom 1 died in the lines) and 1 child dependant as against 6 deaths during 1937. All were Indians. Hospital admissions from Estates amounted to 104 Indians with 4 deaths as against 149 Indians admitted during last year with 5 deaths. There were 18 live births with no still births. They were all Indians.

VITAL STATISTICS.

(a) The population of Perlis for the middle of 1938 determined by the balancing equation method was 55,446. (This population is arrived at by adding to the last Year's figure the excess of births over deaths, as well as excess of immigration over emigration. Up to 1934, the Geometrical progression method had been used to estimate population).

The following is a comparative table for the last six years:—

Year	Estimated Population	Births	Birth rate per mille	Deaths	Death rate per mille
1933 A. D. 	51,644	1,436	27·81	855	16·56
1934 	52,723	1,730	32·81	885	16·79
1935 ,, 	51,101	1,640	32·09	850	16·63
1936 ,, 	51,951	1,961	37·75	1,019	19·61
1937 ,, 	52,703	1,793	34·02	965	18·31
1938 ,, 	55,446	1,982	35·75	1,111	20·04

The population of Perlis as per 1931 Census was 49,296.

(b) Population according to race with deaths and death Rate.

Races	Approximate Population	Deaths	Death rate per mille
Eurasians 	6	...	...
Europeans 	8	...	...
Chinese 	8,103	222	27·40
Malays 	44,360	822	18·53
Indians 	978	29	29·65
Others (mostly Siamese) ...	1,991	38	19·09
Total ...	55,446	1,111	20·04

There were 220 deaths among infants under one year of age, the rate being 111·00 per mille.

(c) Infant death rate for the last 6 years was:—

Year.	..			Deaths.	Rate per mille.
1933 A.D.	..	..	...	.. 134	96.40
1934 „	..	..	..	.. 139	83.43
1935 „	..	..	..	.. 122	79.07
1936 „	..	..	..	.. 218	116.64
1937 „	..	..	..	.. 189	105.41
1938 „	..	..	..	.. 220	111.00

The infantile death rate per thousand births among the principal nationalities was:—

Malays	..	..	..	..	..	.. 98.72
Chinese	..	..	..	..	..	.. 171.34
Indians	..	..	..	..	..	.. 120.00
Siamese	..	..	..	..	..	.. 98.04

(d) Births according to nationalities and sex.

Nationality				Males	Females	Total
Eurasians	...	...	...	...	...	...
Europeans	...	...	...	...	...	...
Chinese	...	...	...	169	152	321
Malays	...	...	...	805	755	1,560
Indians	...	...	...	22	28	50
Siamese	...	...	...	22	29	51
Total				1,018	964	1,982

There were two twin births among Malays.

(e) Still births according to sex and nationality.

Nationality				Males	Females	Total
Eurasians	...	...	...	...	...	...
Europeans	...	...	...	...	...	...
Chinese	...	...	...	15	6	21
Malays	...	...	...	49	41	90
Indians	...	...	...	1	2	3
Siamese	...	...	...	1	...	1
Total				66	49	115

(f) Distribution of deaths according to nationality, sex and diseases.

Diseases			Malays		Chinese		Indians		Siamese		Total		Total	
			M.	F.	M.	F.	M.	F.	M.	F.	M.	F.		
Malaria	...	...	6	2	7	1	2	1	...	...	15	4	19	0.34
Enteric fever	...	...	3	5	1	...	...	1	...	...	4	6	10	0.18
Dysentery	...	...	...	...	...	...	1	1	...	...	1	1	2	0.04
Influenza	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Tuberculosis (Pulmonary)	...	...	28	9	8	...	...	...	1	...	37	9	46	0.83
Other Forms of Tuberculosis	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Leprosy	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Syphilis	...	...	...	...	...	...	1	...	...	...	1	...	1	0.02
Ankylostomiasis	...	...	...	...	2	...	...	...	...	...	2	...	2	0.04
Ascariasis	...	...	2	1	...	...	...	...	...	...	2	1	3	0.05
Fever unspecified	...	...	219	170	33	17	...	3	11	8	263	198	461	8.31
Cancer	...	...	...	...	1	...	1	...	...	...	2	...	2	0.04
Beri-Beri	...	...	...	...	4	1	...	...	...	...	4	1	5	0.09
Diseases of the heart	...	...	1	...	5	...	...	...	...	...	6	...	6	0.11
Other Diseases of Circulatory														
System	...	...	...	1	2	1	1	...	...	...	3	2	5	0.09
Bronchitis	...	...	22	11	4	5	...	...	1	1	27	17	44	0.79
Pneumonia (all forms)	...	...	3	3	27	3	8	1	...	...	38	7	45	0.81
“Demam Batok”	...	...	26	12	11	3	1	...	3	2	41	17	58	1.05
Other diseases of Resp. System	...	...	4	3	...	2	...	...	...	...	4	5	9	0.16
Diarrhoea and Enteritis	...	...	...	...	1	2	...	...	...	...	1	2	3	0.05
Other Diseases of Digestive														
System	...	...	12	8	3	2	...	...	2	...	17	10	27	0.49
Convulsions	...	...	60	39	13	14	...	...	3	1	76	54	130	2.34
Diseases of Nervous System and														
Sense Organs	...	...	1	...	1	...	...	...	...	...	2	...	2	0.04
Non-venereal Diseases of Genito-														
Urinary System	...	...	...	...	1	...	...	...	...	...	1	...	1	0.02
“Basal”	...	...	9	7	1	5	...	...	...	...	10	12	22	0.40
Diseases of Pregnancy, child														
Birth, etc.	...	...	...	18	...	7	...	2	...	...	...	27	27	0.49
Premature Birth and Diseases														
of Early Infancy	...	...	...	...	6	1	2	1	...	...	8	2	10	0.18
Old age or Senility	...	...	29	77	6	3	...	...	1	3	36	83	119	2.15
Violence (all forms, including														
Accidents)	...	...	5	5	5	...	1	...	...	...	11	5	16	0.29
Other Causes	...	...	12	9	10	3	...	1	...	1	22	14	36	0.65
TOTAL	...	...	442	380	152	70	18	11	22	16	634	477	1,111	20.04

(g) Deaths according to sex and nationalities.

Nationality			Males		Females		Total
Malays	...	...	442		380		822
Chinese	...	...	152		70		222
Indians	...	...	18		11		29
Siamese	...	...	22		16		38
Total	...	...	634		477		1,111

(h) Deaths grouped according to age, sex and nationalities, 1938.

Age Groups				Sex	Malays	Chinese	Indians	Siamese	Total
0	...	...	...	{ Males	44	13	3	1	61
				{ Females	18	11	1	1	31
4 weeks	...	...	...	{ Males	22	5	...	1	28
				{ Females	15	7	...	1	23
3 months	...	...	...	{ Males	14	5	...	1	20
				{ Females	8	4	1	...	13
6	..	...	...	{ Males	15	10	1	...	26
				{ Females	18	...	...	...	18
1 year	...	...	...	{ Males	37	8	...	2	47
				{ Females	35	15	...	1	51
5 years	...	...	...	{ Males	26	3	...	2	31
				{ Females	24	3	...	1	28
10	..	...	...	{ Males	5	...	...	...	5
				{ Females	10	1	1	...	12
15	..	...	...	{ Males	2	...	...	...	2
				{ Females	7	...	1	...	8
20	..	...	...	{ Males	17	5	...	...	22
				{ Females	8	3	...	...	11
25	..	...	...	{ Males	12	5	...	1	18
				{ Females	23	...	2	1	26
30	..	...	...	{ Males	16	5	3	1	25
				{ Females	16	2	2	...	20
35	..	...	...	{ Males	20	13	2	...	35
				{ Females	7	4	...	...	11
40	..	...	...	{ Males	29	17	1	1	48
				{ Females	23	4	1	1	29
45	..	...	...	{ Males	21	15	...	2	38
				{ Females	10	1	...	...	11
50	..	...	...	{ Males	29	11	3	4	47
				{ Females	21	3	...	2	26
55	..	...	...	{ Males	50	23	5	2	80
				{ Females	45	6	...	4	55
65	..	...	...	{ Males	31	12	...	2	45
				{ Females	30	4	2	...	36
75 years and above	...	...	...	{ Males	52	2	...	2	56
				{ Females	62	2	...	4	68
Total Males & Females ...					822	222	29	38	1,111

III. MATERNITY AND CHILD WELFARE.

During the year, 27 deaths were recorded as due to affections connected with pregnancy and parturition or a percentage of 1.29 to total births.

The number of still births recorded was 115 or a percentage of 5.80 to total births.

86 cases under "pregnancy, child birth and their diseases" were admitted into hospital and there were 12 deaths or 13.95% to total treated. There were six maternal deaths, three due to complicating diseases (amoebic dysentery, anaemia and cardiac beri beri) one was due to post-partum haemorrhage, and two due to puerperal sepsis, while there were 6 neonatal deaths among children born at the hospital—four due to prematurity, one due to congenital atelectasis of the lung and one due to diarrhoea.

56 cases came in for confinement at the hospital of which 52 were normal deliveries, 3 were complicated with other diseases, and one was a difficult labour ending in forceps delivery. The figure for last year was 27. It is gratifying to record that more and more women are coming into hospital for child birth.

Four fatal cases of tetanus neonatorum (3 Chinese and one Indian) were admitted into hospital.

The first Government—trained Kampong Midwife attended four cases of confinement; she acted in place of the hospital midwife when the latter went on two months vacation leave. The hospital midwife attended 10 cases of confinement in houses. The second pupil midwife who had been sent to Alor Star was expected to return from her training early in 1939.

III. HOSPITALS AND DISPENSARIES.

GENERAL HOSPITAL, KANGAR.

The number of indoor cases treated during the year was 2,075, a slight increase over the number treated during the previous year (1,707).

There were 111 deaths, giving a percentage of 5.35 to total treated. Excluding 48 deaths which occurred within 48 hours of admission, the death rate was 3.11 per cent. The average duration of stay in hospital of fatal cases was 10.62 days.

The daily average number of inpatients was 66.91. The largest number of inpatients on any one day (December 14th) was 106.

In-door patients according to nationalities.

Nationality			No. treated	Deaths	Percentage of deaths	Deaths within 48 hours
Chinese	...	...	1,047	78	7.45	41
Indians	...	...	634	21	3.31	5
Malays	...	...	381	12	3.15	2
Siamese	...	...	12	...	...	...
Others	...	...	1	...	...	...
Total ...			2,075	111	5.35	48

There was an increase in the number of cases admitted for malaria, pneumonia, other lung complaints, ankylostomiasis, ulcers and other diseases; the number admitted for venereal diseases, injuries and pulmonary tuberculosis was about the same, and there was a fall in the number of cases admitted for dysentery.

ADMISSIONS FROM ESTATES AND MINES.

The total number of patients from Estates and Mines was 132 with 5 deaths or a percentage of 3.79.

Nationality				Remained	Admitted	Total	Deaths
Chinese	...	...	...	2	20	22	1
Indians	...	...	...	6	104	110	4
Total ...				8	124	132	5

PREVAILING DISEASES

	1934			1935			1936			1937			1938			Deaths within 24 hours of Admission
	Cases	Deaths	Percentage	Cases	Deaths	Percentage	Cases	Deaths	Percentage	Cases	Deaths	Percentage	Cases	Deaths	Percentage	
Malaria ...	363	18	4.97	376	4	1.06	411	14	3.41	457	10	2.19	538	7	1.30	5
Dysentery amoebic ...	14	...	...	17	1	5.88	14	...	...	14	2	14.29	9	1	11.11	...
Dysentery others ...	...	...	...	...	...	...	2	...	...	15	1	6.67	10	2	20.00	...
Venereal Diseases ...	48	1	2.08	35	...	...	50	1	2.00	58	...	...	59	1	1.69	...
Pulmonary tuberculosis ...	27	6	22.22	29	7	24.14	44	11	25.00	56	11	19.64	51	6	11.77	1
Pneumonia ...	73	43	58.90	68	40	58.82	62	29	46.77	44	15	34.09	72	30	41.67	3
Other lung complaints ...	78	5	6.41	96	8	8.33	99	10	10.10	90	10	11.11	116	5	4.31	2
Ankylostomiasis ...	87	4	4.60	61	3	4.92	96	5	5.21	82	1	1.22	98	2	2.04	...
Ulcers ...	53	...	...	56	...	...	57	...	...	54	...	...	66	...	...	...
Injuries ...	96	...	...	107	2	1.87	134	1	0.75	154	4	2.60	157	1	0.64	1
Other diseases ...	565	37	6.55	650	16	2.48	698	38	5.44	683	35	5.12	899	56	6.23	26
TOTAL ...	1,403	114	8.13	1,495	81	5.42	1,667	109	6.54	1,707	89	5.21	2,075	111	5.35	38

Infectious Diseases with Deaths.

Diseases	Total treated	Deaths	Percentage of deaths
Cerebrospinal Fever	4	1	25·00
Cerebrospinal Meningitis (Pneumo-coccal)	2	2	100·00
Chicken-pox	4	...	...
Diphtheria	2	2	100·00
Dysentery Amœbic	9	1	11·11
Dysentery Type not Diagnosed ...	10	2	20·00
Typhoid Fever	3	2	66·67
Paratyphoid Fever	1	...	...
Erysipelas	5	...	...
Hydrophobia	3	3	100·00
Influenza	100	...	...
Measles	5	1	20·00
Pneumonia	72	30	41·67
Septicaemia	1	1	100·00
Tetanus (a) Neonatorum ...	4	4	100·00
„ (b) Ordinary	3	1	33·33
Tuberculosis (a) Pulmonary ...	51	6	11·77
„ (b) Other type	13	...	...
Whooping Cough	3	...	...
Total ...	295	56	18·98

SURGICAL OPERATIONS.

9 Major Operations and 350 Minor Operations were performed.

LABORATORY WORK .

Blood Films were examined in 6,753 instances with the following results:—

Malaria B.T.	1,075
„ M.T.	791
„ Quartan	7
„ Mixed	275
Negative	4,605
TOTAL ..	6,753

Other specimens examined totalled 4,498 (for details vide Appendix—B).

POST MORTEM EXAMINATIONS. ,

Medico-legal	9
Pathological	16
TOTAL ..	25

OUT-DOOR CASES.

			Kangar Hospital.	Out-door Dispensary,
Number of new cases .. ..	..	..	7,656	8,783
Repetitions .. ..	..	..	5,818	6,193
The nationalities who received treatment were:—				
Malays .. ..	..	..	4,806	764
Chinese .. ..	..	..	1,298	7,788
Indians .. ..	..	..	1,461	165
Siamese .. ..	..	..	57	64
Eurasians .. ..	..	..	..	..
Europeans .. ..	..	..	34	2
Others .. ..	..	..	..	..
			<hr/>	<hr/>
		TOTAL	7,656	8,783
			<hr/>	<hr/>

In addition to those treated at the Dispensaries, 187 cases were treated in the Kangar Gaol.

The Hospital Midwife attended ten cases of confinement in houses.

Neosalvarsan Injections numbered 1,703 of which 1,162 were for yaws and 541 for other conditions. Of the 877 new cases of Yaws that were treated during the year, only a few came up for subsequent injections (vide table below):—

676 patients took only one injection.

157 patients took only two injections.

32 patients took only three injections.

12 patients took only four injections.

69 school children (64 boys and 5 girls) had N.A.B. injections for yaws.

The Travelling Dispensary attended to 1,440 cases, excluding those attended at Schools, Police Stations, Public Works Department and Sanitary Board Cooly Lines. The number of cases attended during 1937 was 411.

One Mental case (male) was transferred to the Central Mental Hospital, Tanjong Rambutan, during the year; one (female) died during the period under review; there were 19 Perlis patients (13 males and females) in that institution at the end of 1938.

There were 4 Perlis lepers—one at Pulau Jerejak Leper Settlement and three at Sungei Buloh at the end of 1938.

R. SIVASAMBANDAN,
Asst. Medical Officer, Perlis.

1st March, 1939 (9-1-58).

APPENDIX—A.

ANNUAL RETURN OF INDOOR PATIENTS, TREATED IN GENERAL HOSPITAL,
 PERLIS, DURING THE YEAR 1935 A. D.

Diseases	Remained	Admitted	Died	Total	Remaining	Remarks
INFECTIVE DISEASES.						
Cerebro-spinal Fever ...	2	2	1	4	1	
Cerebro-spinal Meningitis (Pneumo-coccal) ...	...	2	2	2	...	
Chicken pox ...	...	4	...	4	...	
Diphtheria ...	...	2	2	2	...	
Dysentery Amoebic ...	...	8	...	8	1	
„ Type not Diagnosed ...	2	8	2	10	...	
Typhoid Fever ...	...	3	2	3	...	
Paratyphoid Fever ...	...	1	...	1	...	
Erysipelas ...	...	5	...	5	...	
Gonorrhœa ...	...	18	...	18	3	
Gonorrhoeal Arthritis ...	...	1	...	1	...	
„ Conjunctivitis ...	...	5	...	5	...	
„ Epididymitis ...	...	2	...	2	...	
„ Rheumatism ...	...	1	...	1	...	
Hydrophobia ...	...	3	3	3	...	
Influenza ...	1	99	...	100	1	
Malaria :—						
(a) Benign Tertian ...	4	175	...	179	10	
(b) Quartan ...	...	2	...	2	...	
(c) Malignant Tertian ...	4	163	2	167	6	
(d) Mixed Infection ...	...	55	5	55	3	
(e) Type undiagnosed ...	3	130	...	133	1	
(f) Malarial Cachexia ...	...	2	...	2	...	
Measles ...	...	5	1	5	...	
Pneumonia ...	1	71	30	72	5	
Pyrexia of uncertain origin ...	...	28	1	28	1	
Rheumatism ...	...	8	...	8	...	
Septicaemia ...	...	1	1	1	...	
Syphilis :—						
(a) Primary ...	...	5	...	5	...	
(b) Secondary ...	...	4	...	4	...	
(c) Congenital ...	...	4	...	4	...	
(d) Tertiary ...	...	19	1	19	1	
Tetanus :—						
(a) Neonatorum ...	...	4	4	4	...	
(b) Ordinary ...	...	3	1	3	...	
Tuberculosis :—						
(a) Pulmonary ...	4	47	6	51	10	
(b) Cervical adenitis ...	1	6	...	7	...	
(c) Tubercular Disease (Left Hip) ...	1	2	...	3	1	
(d) Abscess ...	...	3	...	3	...	
Whooping Cough ...	...	3	...	3	...	
Yaws ...	...	5	...	5	...	
Carried over ...	23	909	64	932	44	

Diseases	Remained	Admitted	Died	Total	Remaining	Remarks
<i>Brought forward</i> ...	23	909	64	932	44	
INTOXICATIONS.						
Opium Habit ...	...	6	...	6	...	
Toxic Dermatitis (Arsenical) ...	...	1	1	1	..	
Cerebral Softening (Arsenical) ...	...	1	...	1	...	
Plasmoquine Poisoning ...	...	1	...	1	...	
GENERAL DISEASES NOT INCLUDED IN THE TWO PRECEDING GROUPS.						
Anaemia ...	...	14	1	14	1	
Beri-beri (<i>a</i>) Infantile ...	...	1	...	1	...	
(<i>b</i>) Cardiac ...	...	7	5	7	1	
(<i>c</i>) Ordinary ...	...	14	...	14	4	
Diabetes ...	...	1	...	1	...	
Lymphadenoma ...	...	1	...	1	...	
CERTAIN MORBID CONDITIONS INCIDENT TO VARIOUS PARTS.						
New growth, Non-malignant ...	...	1	...	1	...	
” ” Malignant ...	...	5	2	5	...	
Cyst ...	...	1	...	1	...	
DISEASES OF THE NERVOUS SYSTEM.						
Nerves :—						
Neuritis ...	...	16	...	16	...	
Spinal Cord and Membranes :—						
Locomotor Ataxia ...	1	3	...	4	2	
Brain and Membranes :—						
Hæmorrhage ...	...	4	4	4	...	
Nervous Disorders :—						
Hemiplegia ...	1	2	...	3	1	
Epilepsy Minor ...	...	1	...	1	...	
Mental Diseases :—						
Idiocy ...	...	2	...	2	...	
Mania ...	2	2	...	4	1	
Delusional Insanity ...	...	1	...	1	...	
Dementia ...	1	2	...	3	2	
Observation ...	...	8	...	8	1	
DISEASES OF THE EYE.						
Conjunctivitis ...	...	8	...	8	...	
Keratitis ...	...	1	...	1	...	
Ulcer of Cornea ...	1	3	...	4	...	
Iritis ...	...	3	...	3	...	
Cataract ...	1	...	...	1	...	
Errors in Refraction ...	...	1	...	1	...	
<i>Carried over</i> ...	30	1,020	77	1,050	57	

Diseases			Remained	Admitted	Died	Total	Remaining	Remarks
<i>Brought forward</i> ...			30	1,020	77	1,050	57	
DISEASES OF THE EAR.								
Inflammation	...	...	...	8	...	8	...	
DISEASES OF THE NOSE.								
Sinusitis	...	...	...	1	...	1	...	
Foreign Body	...	...	...	1	...	1	...	
DISEASES OF THE CIRCULATORY SYSTEM.								
Valvular disease	...	...	...	2	1	2	...	
Myocarditis	...	...	...	5	4	5	...	
DISEASES OF THE RESPIRATORY SYSTEM.								
Asthma	...	...	2	23	...	25	2	
Laryngitis	...	...	...	6	...	6	...	
Bronchitis	...	...	1	52	1	53	1	
Broncho-pneumonia	...	...	...	27	4	27	...	
Empyema	...	...	...	2	...	2	...	
Abscess of Lung	...	...	...	1	...	1	...	
Pleurisy	...	...	...	2	...	2	...	
DISEASES OF THE DIGESTIVE SYSTEM.								
Stomatitis	...	...	...	3	...	3	...	
Pyorrhoea Alveolaris	...	...	...	1	...	1	...	
Caries of tooth	...	...	...	2	...	2	...	
Tonsillitis	...	...	...	8	...	8	...	
Gastritis	...	...	...	14	...	14	...	
Gastric Ulcer	...	...	...	11	1	11	...	
Dyspepsia	...	...	...	1	...	1	...	
Appendicitis	...	...	...	1	...	1	...	
Colitis	...	...	...	1	...	1	...	
Duodenal Ulcer	...	...	...	4	...	4	1	
Diarrhoea	...	...	...	21	2	21	1	
Constipation	...	...	...	2	...	2	...	
Colic	...	...	...	22	...	22	...	
Gastro-Enteritis	...	...	...	2	...	2	...	
Fissure of Anus	...	...	...	1	...	1	...	
Haemorrhoids	...	...	...	8	...	8	...	
Hepatitis	...	...	...	7	...	7	1	
Abscess of liver	...	...	...	1	...	1	...	
Cirrhosis of liver	...	...	1	7	1	8	1	
Jaundice	...	...	...	9	...	9	1	
Cholecystitis	...	...	...	1	...	1	...	
Stricture of Rectum	...	...	...	1	...	1	...	
Foreign Body-Oesophagus	...	...	...	1	...	1	...	
DISEASES OF THE LYMPHATIC SYSTEM.								
Bubo	...	...	...	3	...	3	...	
Suppuration of Glands	...	...	...	1	...	1	...	
Lymphangitis	...	...	...	3	...	3	...	
Adenitis	...	...	...	3	...	3	...	
<i>Carried over</i> ...			34	1,289	91	1,323	65	

Diseases	Remained	Admitted	Died	Total	Remaining	Remarks
<i>Brought forward</i> ...	34	1,289	91	1,323	65	
DISEASES OF THE THYROID BODY.						
Goitre-Toxic ...	...	1	...	1	...	
DISEASES OF THE URINARY SYSTEM.						
Nephritis ...	2	9	1	11	1	
Cystitis ...	...	1	...	1	...	
Calculus ...	...	1	...	1	...	
Renal Colic ...	...	1	...	1	...	
Retention of Urine ...	...	1	...	1	...	
DISEASES OF THE GENERATIVE SYSTEM.						
<i>Male :—</i>						
Urethral fistula ...	...	1	...	1	...	
Paraphimosis ...	...	1	...	1	...	
Scrotum Abscess ...	...	3	...	3	...	
Hydrocele ...	...	1	...	1	...	
Periurethral Abscess ...	...	1	...	1	...	
Funiculitis ...	...	1	...	1	...	
<i>Female :—</i>						
Salpingitis ...	...	1	...	1	1	
AFFECTIONS CONNECTED WITH PREGNANCY AND PARTURITION.						
Natural Labour ...	1	52	...	53	...	
Labour-Complicated ...	...	3	3	3	...	
Difficult Labour ...	...	1	...	1	...	
Abortion ...	...	1	...	1	...	
Retention of placenta ...	...	1	...	1	...	
Pregnancy-waiting case ...	...	11	...	11	...	
Post-Partum Haemorrhage ...	...	1	1	1	...	
Puerperal Sepsis ...	...	7	2	7	...	
Rupture Perineum ...	...	1	...	1	...	
Thrombosis of Left Femoral vein (Phlegmasia Alba Dolens) ...	...	1	...	1	...	
New Born Child ...	...	33	...	33	...	
Premature birth ...	...	4	4	4	...	
Still-Birth ...	...	1	...	1	...	
Atelectasis Congenital ...	...	1	1	1	...	
DISEASES OF THE BONES AND ORGANS OF LOCOMOTION.						
Caries of bones ...	1	...	...	1	...	
Arthritis ...	...	5	...	5	...	
Lumbago ...	...	2	...	2	...	
Ankylosis ...	...	1	...	1	...	
DISEASES OF THE CONNECTIVE TISSUE.						
Sinus ...	...	1	...	1	...	
Cellulitis ...	...	12	2	12	2	
Abscess ...	2	24	...	26	3	
Gangrene ...	...	1	1	1	...	
<i>Carried over</i> ...	40	1,476	106	1,516	72	

Diseases			Remained	Admitted	Died	Total	Remaining	Remarks
<i>Brought forward</i> ...			40	1,476	106	1,516	72	
DISEASES OF THE SKIN.								
Urticaria	...	...	...	2	...	2	...	
Eczema	...	...	...	8	...	8	...	
Dermatitis	...	...	...	1	...	1	...	
Boil	...	...	1	16	...	17	...	
Carbuncle	...	...	...	2	...	2	...	
Herpes Zoster	...	...	...	2	...	2	...	
Ulcer	...	...	...	66	...	66	...	
INJURIES.								
Burns and scalds	...	...	1	4	...	5	...	
Wounds	...	...	4	104	...	108	4	
Sprains, contusions etc.	...	...	...	20	...	20	...	
Fracture, Simple	...	...	...	9	...	9	...	
do. Compound	...	...	...	3	1	3	...	
Dislocations	...	...	...	1	...	1	...	
Dog bite	...	...	1	7	...	8	2	
Snake bite	...	...	...	3	...	3	...	
PARASITES.								
Ascaris Lumbricoides	...	...	1	31	...	32	...	
Ankylostomiasis	...	...	2	96	2	98	4	
Ringworm	...	...	...	1	...	1	...	
Taenia Saginata	...	...	...	2	...	2	...	
Scabies	...	...	...	22	...	22	1	
OLD AGE.								
Senility	...	...	...	1	...	1	...	
ILL-DEFINED CAUSES.								
Heart failure	...	...	...	2	2	2	...	
Malingering	...	...	...	1	...	1	...	
Under Observation	...	...	...	43	...	43	...	
For sake of mother, child etc.	...	...	2	100	...	102	3	
TOTAL ...			52	2,023	111	2,075	86	
NATIONALITIES:—								
Chinese	...	...	25	1,022	78	1,047	39	
Indians	...	...	18	616	21	634	26	
Malays	...	...	7	374	12	381	20	
Siamese	...	...	2	10	...	12	1	
Others	...	...	...	1	...	1	...	
TOTAL ...			52	2,023	111	2,075	86	

APPENDIX B.

LABORATORY WORK.

(Includes Return from Out-door Dispensary, Kaki Bukit and Health Department, Perlis.)

Specimens				Positive	Negative	Total
Blood (Malaria) ...	...	...		2,148	4,605	6,753
Blood (Filaria) ...	...	...		...	2	2
Pus (Gonococci) ...	...	...		45	26	71
Eye Smear ...	...	...		6	22	28
Nasal Smear ...	...	...		...	6	6
Sputum (Tubercle Bacilli) ...	...	...		39	325	364
Stool ...	...	...		1,765	573	2,338
Urine ...	...	...		265	1,418	1,683
Cerebrospinal Fluid (Meningococci) ...		...		6	...	6
Total ...				4,274	6,977	11,251

APPENDIX C.

RETURN OF SICK PRISONERS ADMITTED INTO KANGAR HOSPITAL, 1938.

Diseases						Cases
Gonorrhoea	...	...	...	...	...	1
Influenza	...	...	...	...	...	18
Malaria, (a) Benign Tertian	...	...	...	...	...	2
(b) Malignant Tertian	...	...	...	...	...	2
Pyrexia of uncertain origin	...	...	...	...	...	1
Pulmonary Tuberculosis	...	...	...	...	...	1
Opium Intoxication	...	...	...	...	...	2
Ulcer of Cornea	...	...	...	...	...	1
Asthma Bronchial	...	...	...	...	...	2
Colic Abdomen	...	...	...	...	...	2
Arthritis	...	...	...	...	...	1
Abscess	...	...	...	...	...	1
Ulcer	...	...	...	...	...	1
Wound	...	...	...	...	...	1
Ascariasis	...	...	...	...	...	3
Ankylostomiasis	...	...	...	...	...	3
Ringworm	...	...	...	...	...	1
Malingering	...	...	...	...	...	1
For Observation	...	...	...	...	...	2
Total						46

There were no deaths.

APPENDIX D.
REPORT SHOWING THE NUMBER AND TYPES OF ANOPHELINE LARVAE COLLECTED IN PERLIS DURING 1938.

PLACES	A. ait. bengalensis	A. aconitus	A. aitkeni	A. barbivostis	A. barbumbrosus	A. hyrcanus	A. Insulæflorum	A. karwari	A. Kochii	A. leucosphyrus	A. maculatus	A. malayensis	A. minimus	A. ait. Palmatus	A. philippinensis	A. sinensis	A. umbrusus	A. vagus	A. (pupæ)	A. subpictus	TOTAL
Arau	...	...	...	45	...	4	...	...	19	...	...	...	...	...	...	6	...	7	13	...	94
Kaki Bukit	6	...	...	34	...	...	...	...	35	...	13	...	...	1	...	4	...	...	...	2	95
Kangar	...	...	...	123	...	17	...	...	124	...	...	...	...	...	13	102	...	249	4	...	632
Total	6	...	...	202	...	21	...	...	178	...	13	...	...	1	13	112	...	256	17	2	821

APPENDIX E.

REPORT SHOWING THE NUMBER AND TYPES OF MOSQUITOES CAUGHT IN
PERLIS AND IDENTIFIED IN THE HEALTH OFFICE, PERLIS.

PLACE		A. sinensis	A. vagus	A. kochi	A. barbirostris	A. philipinensis	A. aconitus	A. annularis	A. nigerimus		TOTAL
Kangar	...	21	51	8	49	28	4	2	43	...	206

APPENDIX F.

METEOROLOGY, 1938 A.D.

RAINFALL.

January	..	..	..	..	..	..	0.62
February	..	..	..	..	..	..	2.51
March	..	..	..	..	..	..	5.82
April	..	..	..	..	..	..	5.86
May	..	..	..	..	..	..	7.46
June	..	..	..	..	..	..	6.77
July	..	..	..	..	..	..	1.73
August	..	..	..	..	..	..	11.77
September	..	..	..	..	..	..	13.52
October	..	..	..	..	..	..	5.25
November	..	..	..	..	..	..	5.75
December	..	..	..	..	..	..	7.67
TOTAL							74.73 inches.

The maximum and minimum temperatures in the shade were 95° on 2-3-38 and 67° on 10-12-38.

Greatest Rainfall in 24 hours was 2.29 inches on 24-9-38.

Lowest maximum was 75° on 17-11-38 and 14-12-38.

Highest minimum was 77° on 24-4-38, 25-4-38, 6-10-38 and 8-10-38.

Kangar town was flooded for two days in the year viz., on 18-11-38 and 19-11-38.

SOUTH KEDAH
KAMPONG IMPROVEMENT
YEAR ENDING DEC: 1938.

Scale, 2 Miles to an Inch
Mile 1 0 1 2 3 4 5 6 7 8 9 Miles



REFERENCE		
	MUCH IMPROVED	
	MODERATELY IMPROVED	
	SLOW IMPROVEMENT	
I Kg. Sungei Siuang 1. Bukit Sarang Ayam 2. Batu Lapan 3. Padang Matseh 4. Padang China	VI Kg. Sidam Kanan 1. Guar Lobak 2. Dekeh 3. Ikor Kuching 4. Bangol Besi 5. Tanjong Belit 6. Jerat Batu	X Kg. Ulu Mahang 1. Ulu Dingin 2. Banggol Kabu 3. Lobak 4. Paya
II Kg. Bagan Samak 1. Matang 2. Permatang Pasir 3. Paya Takong 4. Telok Kelian	VII Kg. Terap 1. Sungei Tengas	XI Kg. Keladi 1. Pondok Labu
III Kg. Bukit Buloh 1. Sungei Itam 2. Terap 3. Sungei Tengas	VIII Kg. Serdang 1. Sungei Punt 2. Leret 3. Sungei Setul 4. Ayer Puteh	XII Kg. Karangan 1. Sungei Kob 2. Jangkong 3. Sebrang 4. Bukit Sang
IV Kg. Sedim 1. Sungei Relau 2. Padang Relau	IX Kg. Sungei Batu 1. Sungei Taka 2. Jermal 3. Rantau Panjang	XIII Kg. Junjong 1. Ayer Puteh 2. Matang Tiong 3. Pdg. Janggos 4. Binjal
XIV Kg. Sungei Kechil Ilir 1. Sungei Boya	XV Kg. Padang Meiho 1. Siam 2. Tengas 3. Bunut 4. Merbau Pulas	

KAMPONG SANITATION CAMPAIGN CENTRAL KEDAH



